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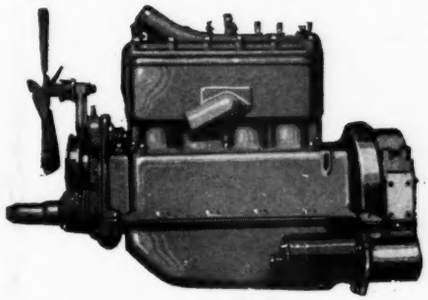
The Best Proof of the Four Cylinder Motor Is Its Place in the Truck Field



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AUTOMOTIVE INDUSTRIES
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VOL. XLV. NEW YORK—THURSDAY, NOVEMBER 24, 1921 No. 21

Growing Demand for Low Priced Closed Car

Closed car sales have grown in spite of great difference in open and closed car prices. Wide market apparent for cheaper closed models. Break with coach building tradition necessary. Bodies, designed for mass production, necessary and practicable.

THERE is a definite demand for a low-priced closed car. It has become generally recognized throughout the industry that price is the chief obstacle in the way of vastly increased closed car sales. In many ways a rather large part of the automobile public has evinced its desire for closed bodies, but the great differential between touring and closed body prices has prevented that desire from resulting in volume of sales. Norval A. Hawkins stated recently that the automobile owner is the boss of every man within the industry. And it may be added that in the long run this boss is going to get what he wants.

He has expressed a strong desire for closed bodies at a comparatively low price. He believes that the difference between closed and open body prices is too great and that it must be reduced. This is the demand of the boss. The industry must and will meet that demand as it has in the past.

The sale of closed cars has increased very greatly during recent years, despite relatively high prices. Closed cars have constituted a constantly increasing percentage of total production for the last two or three years. In 1919 closed cars comprised 10 per cent of the total production; in 1920, 17 per cent. Regardless of increasing desire on the part of the public for closed cars, however, the sale of this type of vehicle is definitely limited so long as there is so wide a difference in price between it and the open model. In other words, the increased percentage of closed cars, in spite of the high-price differential, indicates clearly the trend of demand, while obvious financial limitations of certain parts of the public place a fairly low limit on possible ultimate closed car sales so long as this price differential remains.

This growing interest in a cheap vehicle, which will provide protection from the weather and still retain lines pleasing to the eye, has brought the permanent top into considerable prominence. A recent questionnaire, for instance, showed that 33 out of 49 manufacturers who answered feel that there is a definite tendency toward the use of the permanent top as standard equipment. While this, of course, is not directly related to the closed car problem, it is another indication of the general tendency toward a permanent form of protection.

As the automobile has taken its place very definitely as a utility vehicle, a majority of users **need** an all-year car. Many others, even those who use their cars primarily for pleasure purposes, **desire** such a model. There are undoubtedly many persons to-day who use open cars throughout the year, often at the price of considerable personal discomfort, simply because of the high-price differential of the closed models.

These facts indicate that there is a definite field for the cheap closed car. Reduced prices on closed

models would automatically increase sales very greatly and would aid materially in eliminating the seasonal character of car selling and production. If a satisfactory cheap closed job were produced many people, in addition to the classes already mentioned, would undoubtedly be interested. People who never considered closed cars before, because such jobs were out of their price range, would immediately become potential buyers. It is significant that the cheapest closed car on the market has the greatest volume of sales, as has the cheapest passenger car. This is natural and, perhaps, obvious, yet has an important bearing upon an examination of the possible market for the cheaper closed job.

Reducing Production Costs

There are two possible methods of reducing closed body prices. One is to utilize present methods more efficiently and build the usual carriage bodies of the past at a lower price. There is an opinion in certain quarters that the average closed body of to-day could be profitably sold at a lower price.

The possibilities in this direction, however, are comparatively small. To manufacture a closed body which will leave but a small differential from open body prices involves a radical departure from present body building methods. It is the development of a utility type closed body, manufactured rather than built, that gives promise of volume growth in closed body sales.

There will always be a class of buyers, of course, which will demand de luxe closed bodies and fine coach work. But this class does not include the great mass of automobile owners who comprise the market for volume sales. This latter class desires neat, efficient lines and adequate protection from the weather. They want a lower price and to get it are willing to forego a piano-like finish and curves in body and roof which hark back to the middle ages for their origin.

There is nothing offensive to the eye in simple, straight lines. Yet the use of such lines in body design will allow cheaper and more efficient manufacturing methods. The automobile maker has been a pioneer in manufacturing methods in many ways; he has not allowed himself to be hampered by tradition in chassis production methods. Yet the clinging tradition of the coach builder has kept body design and body production methods far behind the rest of the car. There is no reason, fundamentally, for building up every closed body like a small yacht.

Simpler body design will result in simpler construction methods. These, in turn, will bring about standardization and interchangeability, and consequently lessen body service problems. All this can be done without sacrificing, except to a limited extent, the artistic features of the closed body.

Work along these lines has already been started, and at least one company is producing commercially a model which embodies many progressive design and construction ideas. The surface has only been scratched, and the problem is equal in importance to any facing the engineering departments of the industry at present.

It is impossible at this time to point out definitely and in detail how this utility body can be designed and built. This must be the subject of considerable research and experimentation. Yet certain broad principles stand out clearly and form a basis of procedure for such studies.

Some consider it impossible to provide sufficient strength in a delicately rounded body without using expensive forms of construction. It is also difficult to provide water-tightness in bodies of this form without using expensive methods. Construction is expensive because these curves require hand-work. On practically all of the high-priced bodies it appears impossible to stamp out the metal work on dies. Hand-hammering is required and the hand-hammerers in a body sheet metal department are among the highest paid laborers in this industry.

To mold a sheet of aluminum around the curved corners of a sedan body requires a great amount of skill. It is necessary, to make a successful job, that the sheet metal worker not only hand-hammer the metal to shape accurately, but also, while working on the metal, keep it heated to a temperature which will anneal the metal and free it from internal strains. Even to secure the preliminary form of the curved sheet metal part, hand-hammering must usually be resorted to.

Simple, straight pieces of wood are far less expensive to cut and form than the many curved pieces required in the ordinary type of sedan, town car, limousine or coupe. The average closed body is really a built-up job. It is not made on a quantity production basis. The various units are not put through, completed and assembled as are other parts of the automobile. Consequently, trimming and interior finishing is a lengthy job, involving some of the most exacting methods practised by the upholsterer. Ways can be found to eliminate these difficulties. But precedents must be shattered. The problem must be approached from a fresh viewpoint.

Experts state that if bodies were made so that they could be assembled instead of built up in the usual manner, the time necessary for trimming operations would be reduced from one or two days to two or three hours.

One car recently announced, for example, has its top made as a separate piece. The head lining is stretched across the body before the top is put on. This does away with the intricate fitting and inconvenient interior tacking which is necessary with the usual fixed-roof type of closed car, but which must be done in cramped positions and is therefore slow and expensive.

Practical Methods

Considering the closed car as a business man's vehicle, used in daily work, several important design concessions could readily be made for the sake of more economical production and lower price. Among these are:

1. Exposed screw heads might be permissible.
2. Straight lines may replace curves without spoiling the appearance or usefulness of the car. The purpose should be chiefly to fill the buyer's needs and increase sales, rather than to satisfy the body builder's ideas of art.
3. The body might be trimmed to some extent with half-round molding or other standard forms of trim which are inexpensive.
4. Four doors are not necessary in a car of this kind. The two extra doors cost a great deal of money, prevent standardization as regards glass sizes, window framing sizes, etc. If such standardization were effected cost would be materially reduced.

These things are simply typical of many others of similar nature, some of which are known and some of which will be discovered, which will effectively reduce closed body prices. Coach builders' tradition, however, must be forgotten, and methods passed down for centuries must be scrapped if progress is to be made.

The primary reason that present closed bodies are so expensive appears to be that too much expensive hand labor is required, and that too expensive materials are employed. When chassis parts are made in quantity certain limits and tolerances are established, and in making the individual pieces the limits are observed and jigs are employed so that when pieces which are to go

together are assembled they fit without hand-work. In short, interchangeability is maintained. In Europe such a thing was not heard of a few years ago and even to-day it is customary to do a lot of hand filing and fitting before chassis parts are assembled. This has greatly retarded the automotive industry there by reason of the great expense involved. The situation with respect to the closed body is similar in this country. We have simply failed to adapt fully our quantity production methods to closed body manufacture.

One reason for this is that body styles change, and expensive tooling is often avoided because of fear that style change will make it necessary to scrap tools before they have served to effect the economy for which they are intended. This situation can and must be changed. The public as a whole will willingly give up the latest fad so long as there is a compensating saving in price and they are not asked—as they need not be—to accept something that is displeasing to the eye.

The interchangeable veneer panel is already produced in quantity, as is the metal panel in some instances. Might it not carry this idea further, but employ methods which will not require hand fitting later? In other words, use jigs and gages which insure perfect assembly without fitting. Again, why not make sub-assemblies which can be quite or nearly finished, including, perhaps, all but the final painting operations? These should be arranged to go together without fail in a final assembly which is built up in a few moments, not fitted together piece by piece, occupying in the meantime, perhaps for a month or more, valuable floor space. Problems of getting good joints and of hiding or rendering inoffensive the fastening means present difficulties, but they are not insurmountable.

WE must abandon the hand-fitting methods used in the old-fashioned coach builders' and custom body builders' plants and adapt body construction to the same interchangeable quantity production methods used in the manufacture of chassis parts, if the price of the closed body is to be materially reduced.

There is an insistent demand for moderately priced closed body cars which must be met. It can be met only by following the methods which made it possible to produce low-priced chassis. When so met it will greatly increase the market for the closed car, just as the application of quantity production methods increased the market for the low-priced open car.

It might well be possible to use interior trim that is less expensive than the present costly fabrics, and to prepare this on light frames which can be quickly fastened in place. Such units would, of course, be made on the bench, the covering fastened on by rapid machine methods, and the slow tacking in awkward positions within the body largely or wholly avoided.

In at least one plant closed body roofs are already made in a separate piece and fastened on after some of the trimming is in place. A similar procedure might easily be followed in respect to other units, such, for example, as the complete back framing of the car, if the design was laid out with this in mind.

Cheaper wood can be used for some body parts in which the stresses are lighter than in the more important members, where adequate strength and stiffness is of prime importance.

There is room for much improvement in respect to external finishing. Enameling could no doubt be more extensively used. Painting and rubbing down by hand for a dozen or more coats of paint and varnish gives a fine appearance, but is much too expensive in time and material and not at all in keeping with modern production methods. Spray painting is used for wheels and some chassis parts. It may well be adaptable on body parts, at least for certain kinds of finish or for some of the earlier coats. If a built-up assembly is feasible, it should be possible to do much painting on sub-assemblies before final assembly.

Some of these are only suggestions which may or may not prove practicable. They should, however, be given consideration in common with all other suggestions looking toward less expensive closed body production, for only in this way will we bring this phase of manufacturing in step or on a par with our advanced methods of chassis part production.

The opinion of men within the industry indicates strongly that cheaper closed bodies are possible and that action along this line can be expected in the near future.

One large body manufacturer who graduated into this business from the old carriage days and who has been president of one of the largest body manufacturing establishments in Detroit, stated: "We will design closed bodies within one year which will cost about two-thirds of what they do to-day."

Another manufacturer is of the opinion that closed body prices can be brought very close to open body prices. He is experimenting with a body which can be built up in units and shipped, if necessary, in this form. He believes that this method, similar to the fabricated ship idea, will result in manufacturing economies and will reduce prices materially.

Some engineers are still of the opinion, however, that the public will not accept bodies built along economy lines which will, of necessity, lack certain features not contained in the coach-built job. A body engineer, whose company produces a $1,000 car in great quantities, believes that the public demand for full pillars, plate glass, four doors, window regulators, and so forth, is responsible for keeping up the price of closed bodies. This company, however, has been working for five years endeavoring to get a closed, all-steel body which could be finished within four or five days. In other words, make an enameling proposition out of it.

As might be expected, body engineers connected with firms making higher priced cars are not convinced of the possibilities of radical design changes on their product so far as bodies are concerned. Buyers of high-priced cars are always likely to demand the refinements given by coach building methods.

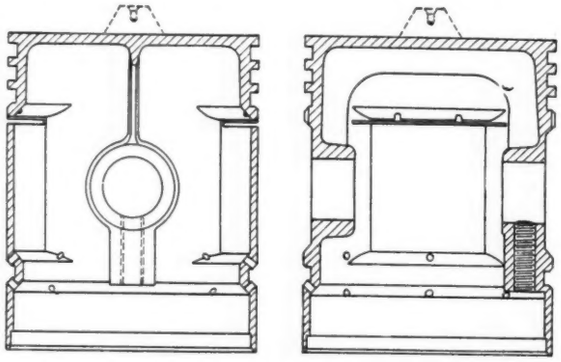
A general survey of the field indicates a strong belief in the possibilities of reduced cost in closed body construction. Body designers and production men will have to co-operate and experiment together to solve the problem. It is almost certain, however, that the body production man is going to play a larger part in body design than he has in the past.

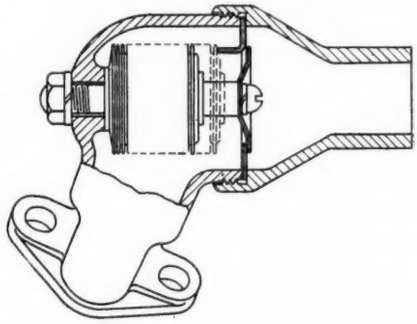
Even at the present time, in fact, there is scarcely a body engineer in the industry who will not admit that he could bring out a cheaper, yet satisfactory, design if he wanted to shatter precedent and perhaps sacrifice something in the way of ornamentation and esthetic beauty. Many believe such a body would create serious sales resistance, however, and are dubious as to the reception which the public might give. It is certain, however, that the public is demanding lower closed body prices, and the problem of giving such prices without arousing prejudice against a new type body is urgent.

Several Changes Made in Cole Eight

Improvement made in aluminum alloy piston which now is slotted below ring belt. Thermostats added to cooling system. Pressed steel clutch cone reinforced and provided with clutch brake. Brake operating linkage redesigned and frame stiffened. Improvements in chassis and body.

A BRIEF outline of the mechanical and other changes made in the Cole car for the coming season was given in the news columns of a recent issue, and herewith are presented illustrations and further details of these changes. One of the changes pertains to the aluminum pistons which now, as formerly, are of what is described as the constant clearance type. These pistons are cast in metal molds of an aluminum alloy and are slotted circumferentially below the lowest of the three piston rings above the piston pin. The slot is cut by means of a 1/16-in. saw and extends over an arc of 83 deg. on each of the two pressure sides of the piston. By means of central ribs the load due to the gas pressure is transferred directly from the piston head to the piston bosses. There are four rings on the piston, three above and one below the piston pin. The lowest of the three upper rings is a double "pressure-proof" ring. At the top of the piston a clearance of from 0.019 to 0.021 in. is allowed and at the bottom of from 0.0015 to 0.0025 in. From the latter figures it will be seen that the pistons are a snug fit in the cylinder even when cold. By casting the piston with a wide relief area around the ends of the piston bosses a sort of crosshead effect is obtained. Around the bottom piston ring there are eighteen 5/32-in. holes drilled at 45 deg., to act as oil drains, and similar oil drain holes are cut below the lowest of the three upper rings.





(Left)—New Cole pistons are of constant clearance type. (Right)—Sylphon thermostatic valve

An alteration has been made in the water system by the incorporation of thermostats which are placed on the water outlet of each cylinder head and used for the purpose of regulating water temperature and shortening the period of time required for warming the engine. The thermostats are of the sylphon type and are set to open at 150 deg. Fahr.

The clutch has been improved in a number of details. It is still of the cone type with fabric facing, but it now requires materially less pedal pressure to release it and the cone is reinforced at the circumference to prevent distortion. The clutch is equipped with a braking device which begins to function immediately upon release of the clutch and automatically increases in effectiveness as the clutch is withdrawn farther. Its pressure can be adjusted as occasion demands. A maximum foot pressure of only 20 lb. releases the clutch. Provisions are made to lubricate the clutch release bearing through a tube located on the front of the dash. This tube leads directly into the bearing and a few drops of oil squirted into it periodically will keep the clutch release lubricated.

Another improvement is the use of coil type clutch springs in place of flat springs. These are mounted in small cages and can be adjusted to give the desired effect. The clutch brake shoe is on a spring and the cone is flanged over with a stiffening flange at the rear against which the clutch brake shoe acts.

Another improvement is the relocation of the centers of the brake operating linkage. The inverted type with the pivot center below the center line of the axle is now used for the operating link which, in connection with the Hotchkiss drive, gives maximum brake effect without chatter, it is claimed. The leverage has been increased so that light foot pressure will apply the brakes fully. The service brakes are external contracting and the emergency, internal expanding. The brakes are lined with Multibestos and have an area on the service brake of 240 sq. in. and on the emergency brake, 210 sq. in. The reduction from the brake pedal and hand lever to the rear axle is 4 to 1. Oilless bushings are employed in the brake shaft.

The frame has been stiffened considerably in this new model. Additional members have been provided front and rear to prevent side weaving. The independent radiator and front engine support cross-members formerly used are now combined into one rigid, wide unit, materially strengthening the frame to resist twisting strains. A new cross-member is located behind the transmission gearset and ties the frame securely at this point to prevent body strains. Welted, anti-squeak material is now used between all sheet metal parts, and a thick, wide cork anti-squeak is placed between the body and the frame to give a firmer and quieter support for the body. The spring shackles are now made adjustable to permit of eliminating noise caused by side slap, and the radiator

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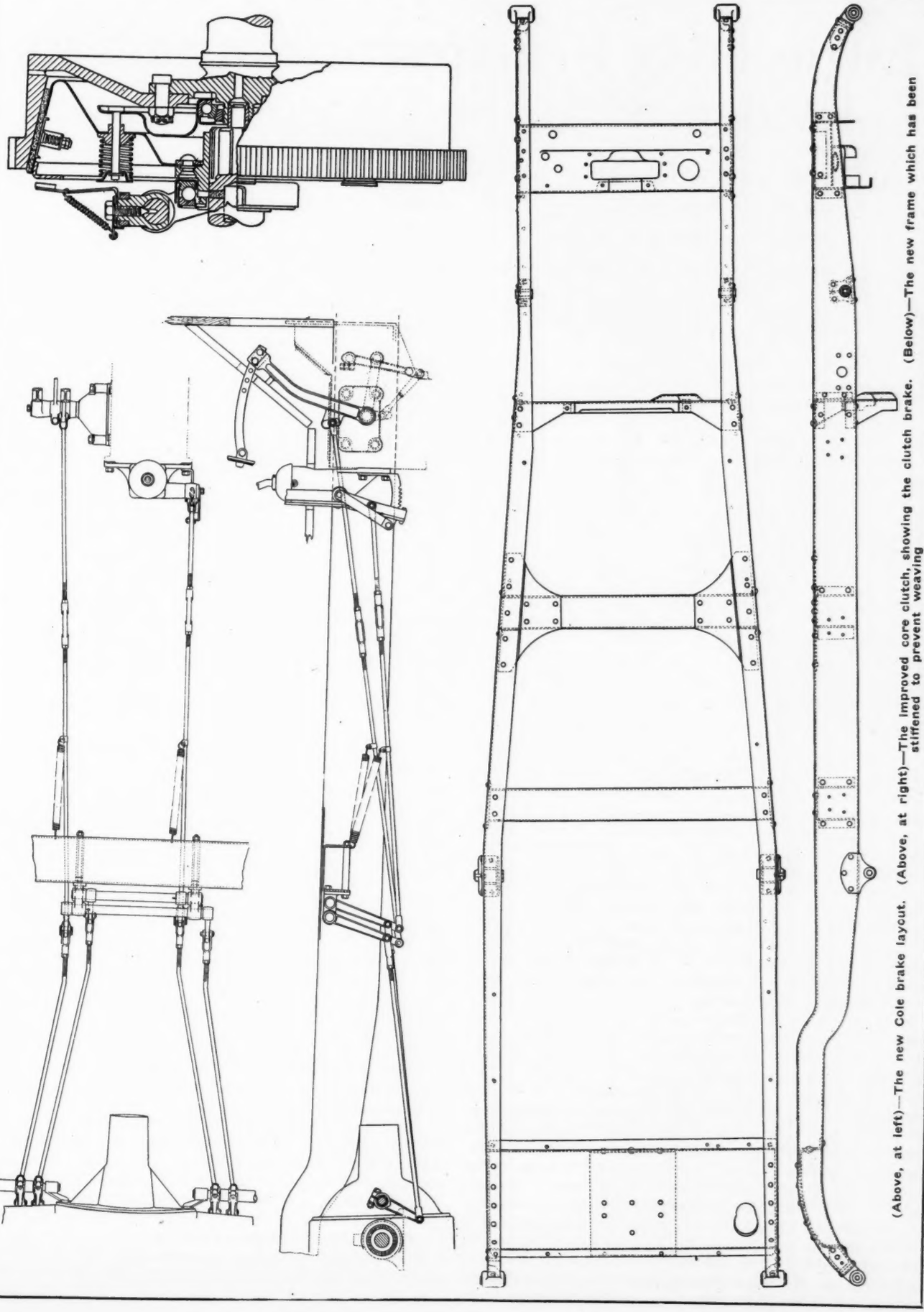


(Above, at left)—The new Cole brake layout. (Above, at right)—The improved core clutch, showing the clutch brake. (Below)—The new frame which has been stiffened to prevent weaving

Engineering Features of British Cars Evidenced at the London Show

Marked increase in number of 70 cu. in. engines one outstanding feature. Gains in percentage of overhead valves, aluminum pistons, pressure lubrication, heated manifolds and spiral bevels are noted. Magneto ignition still predominates. Four-speed gearset is losing ground.

By M. W. Bourdon

TWO features stand out prominently after a study of the exhibits at the London show. The first is the increasing number of makers who apply their energies to more than one or two chassis models, and the second is the large number of new chassis with engines of approximately 70 cu. in. displacement, offered either for two-seated bodies with dickey seats or for small, four-passenger bodywork.

Concerning the multiplicity of chassis models, this was a feature of British plants before the war, but at the 1919 show there was a clearly apparent tendency to specialize. Many firms who had previously offered up to five or six different chassis had got down to one or perhaps two. But at this year's show the old order is again in evidence. Wolseley, for instance, has four entirely different chassis of 7, 10, 15 and 20 hp., including one two-cylinder and one six-cylinder model. With these four chassis is offered a range of bodies numbering nearly twenty, taking into account alternative equipments.

In my cabled report of the show I referred to the comparatively large number of new models falling within the light car class. At Olympia this type was shown by such well-known firms as Wolseley, B. S. A., Standard and Rover, as well as by over twenty others of less renown. It shows considerable divergence in power plant practice, as will be realized when it is said that the little Wolseley has a horizontally opposed twin-cylinder, water-cooled engine, the B. S. A. a 90-deg. Vee air-cooled, the Standard a four-cylinder, water-cooled overhead valve, and the Rover a horizontally opposed, air-cooled engine. Then, too, the Wolseley has a unit power plant, in which it resembles the Rover; the B. S. A. has an amidships gearset, while the Standard has it bolted to the head of the propeller shaft casing.

Most of these miniature cars are offered as two-seaters, some of them with a dickey seat. They weigh in this form from 1000 to 1300 lb., which is quite sufficient load with a full complement of passengers for engines of less than 70 cu. in. displacement. In several cases, however, they are offered with small, four-passenger bodies and then weigh little, if any, more than the two-seater with dickey. But this phase of British automobile development is so important that it is proposed to deal with it separately on another occasion.

Meanwhile it may be said that the light four-seaters with engines of from 75 to 100 cu. in. are still developing and are in even greater favor. In some cases the engine has been slightly increased in size to cope with the additional weight of better bodies, heavier axles or longer springs. But the type remains, and to suggest to a maker that his "light car" is no longer in that category is to raise in him something approaching ire. The light car is by far the most popular type at the moment, but where the class begins and where it leaves off it is impossible to say.

Two concerns associated with the S. T. D. combination —namely, Sunbeam and Talbot—have put forward new overhead valve models which are small, high-class jobs. These have 14-hp., four-cylinder engines (2 13/16 x 4¾ in.) and, with four-passenger bodies, sell at £720.

In what may be termed full-size cars there has not been much development during the past year. Armstrong-Siddeley has come forward with a new 18-hp., six-cylinder model having the main characteristics of the 30-hp. model, which is being continued. The additions of Straker-Squire and of Guy were referred to in my cable. Talbots are offering a 15-hp. and a 25-hp. as new types, though they are of the same general design as those they displace.

The only radical departure from normal practice in cars over 15 hp. is in the new 20-hp. Vulcan, which has a cuff valve engine, a short sleeve being reciprocated above the cylinder proper by means of a two-cycle cam groove. This design is claimed to enable 82 b.hp. to be developed at 3200 r.p.m. by a four-cylinder, 3½ x 5½-in. engine, with an m.e.p. of 114 lb. and a compression ratio of 4½ to 1.

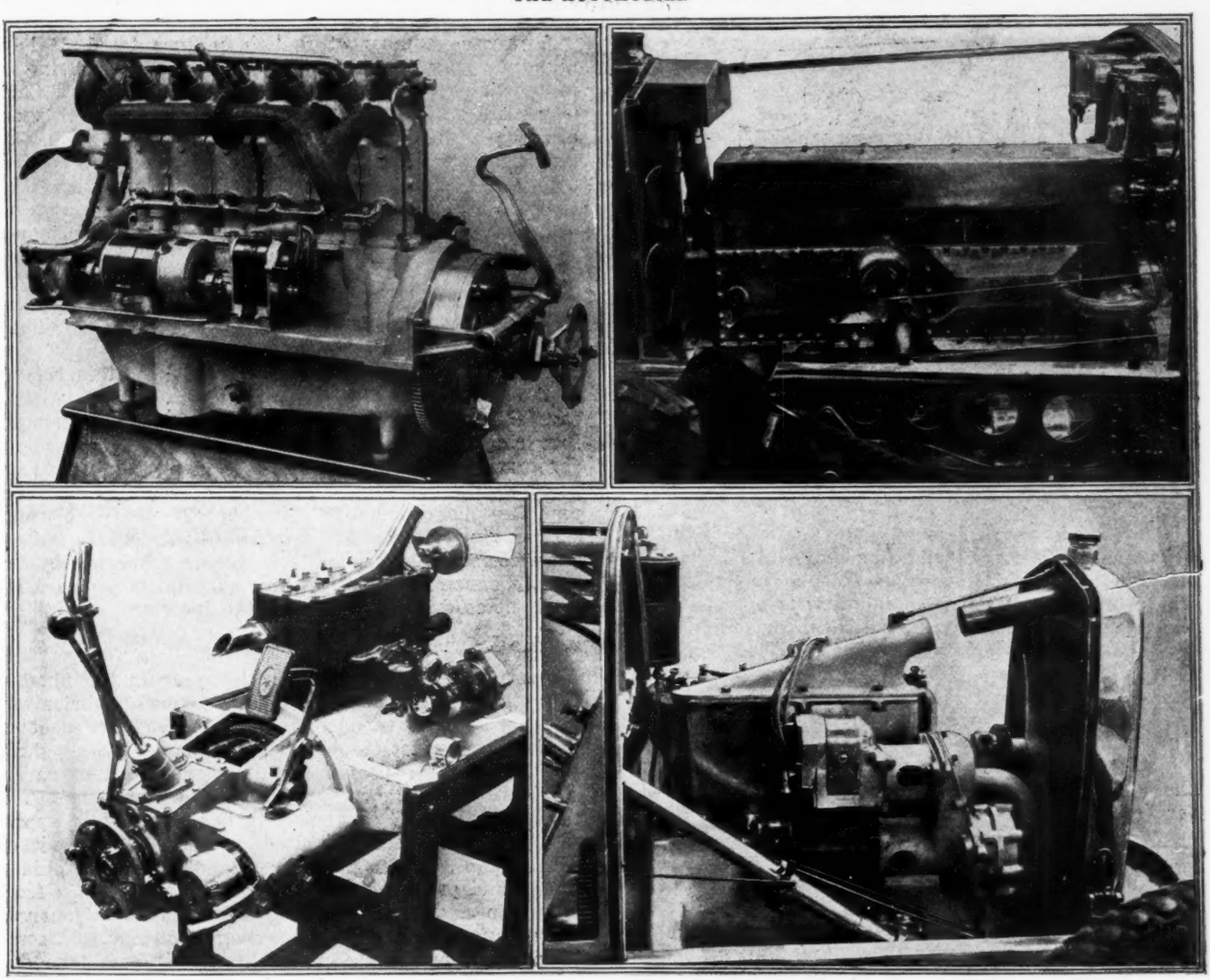
Number of Cylinders

This year's show does not bring to light any marked move away from the outstanding popularity of four cylinders, as was made apparent by the figures given in my cable report. There are more two-cylinder engines than last year, and these now represent 8 per cent of the total.

The Guy "8," with cylinders set V fashion, is alone among British cars representative of this type, and the same can be held to apply to the Leyland straight 8, though brief particulars are to hand concerning two new British-built cars with engines of this type.

Detachable cylinder heads have slightly increased in number, and now they are found on 53 per cent of engines, as compared with 49 last year. Block-cast four-cylinders have given way slightly on account of the prevalence of pair-casting in recent introductions, but are still found in 90 per cent of all four-cylinder motors. Among six-cylinder engines all possible groupings are met with; pairs and threes predominate, with 40 per cent each, blocks and singles being represented by 10 per cent each.

The plan of forming the cylinder block as a unit with the upper half of the crankcase has been adopted on



(Upper left)—Straker-Squire 30 hp. six cylinder engine, unique in having overhead camshaft on separately cast cylinders. (Upper right)—Leyland straight-eight block engine, camshaft driven by triple eccentric rods. (Lower left)—Power unit of new 12 hp. (2¾ x 4¾ in.) Star. (Lower right)—Enfield-Allday generator-magneto cylindrical support brackets, with silent chain drive to magneto

the new 20-hp. Vulcan and the new 14-hp. Sunbeam and Talbot aluminum engines. These, however, are the only representatives of this type of construction, cast iron for the cylinders and aluminum for the crankcase being almost universal.

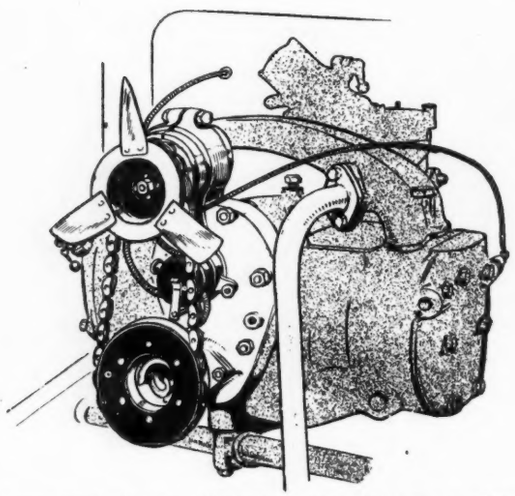
Valve Arrangement

Overhead valves have increased in popularity, now constituting 24 per cent of the total (+ 2.5 per cent), while L-head cylinders, with 66 per cent to their credit, show a drop of 6 per cent. Three makers are using sleeve valves, all of a different type—namely, Daimler with the Knight, Argyll with the Burt & McCullum and Vulcan with the Howard. These are isolated cases where the inlet valve is superimposed on the exhaust, but this arrangement is not seen on cars of any great renown.

As regards push-rods and rockers for overhead valves, rarely indeed does one fail to find some special provision for automatic lubrication of the rocker bearings and their joints in the push-rods. In the 11-hp. (now 3x4 5/16 in.) Standard, the 18-hp. and 30-hp. Armstrong-Siddeleys, the Lanchester, Wolseley and one or two others the rockers or the overhead camshafts, as the case may be, receive pressure lubrication from the main system. In the new Sunbeam engines, all of which have push-rod operated overhead valves, and in the 14-hp. Talbot a branch pipe from the main pressure system is carried along over the rocker shaft, and has small holes drilled on the underside of it to allow drops of oil to fall on to the grooved upper surface of each rocker, a central hole with a countersunk top end carrying the lubricant to the pivot bush. On the new 8-hp. Standard the whole rocker shaft is plugged with wick, and at its front end is a large oil cup, replenishment of which is said to suffice for 500 miles or so. In all cases mentioned, except the last, excess lubricant drains back into the crankcase, the overhead valve gear being inclosed by an aluminum cover plate.

Distribution Gear

In engines with the camshaft in the crankcase the silent chain has still further gained in popularity, being represented on 60 per cent of engines, but, strangely enough, the helical gear has receded in favor of straight-toothed form, which twelve months ago seemed likely to disappear entirely. To a certain extent this is due to the new two-cylinder engines. Overhead camshaft drives are found in half a dozen different forms. Wolseley retains the primary silent chain to transmit the drive to a vertical shaft with bevel gearing. Lanchester and Ensign have worm gearing at both ends of the vertical shaft, other makers utilize helical gearing, spiral



Front end of 7 hp. Wolseley horizontal twin engine, showing ignition unit and generator at rear end of fan shaft

bevels and a direct transmission by silent chains, while Leyland uses a triple-eccentric, connecting-rod device. The overhead camshaft, incidentally, is not confined to the largest and most expensive cars, for it appears on the new six-cylinder, 12-hp. A. C., 11-hp. Beardmore, 18-hp. Phoenix, two Wolseleys and a new 9-hp. light car which still has to make a name for itself.

Water Cooling Systems

The plan so greatly in evidence at the 1919 and 1920 shows of providing a belt transmission for the pump, or for what was merely a water accelerator in a thermo-syphon system, has appreciably lost favor, and, instead of only 55 per cent of engines having a positive pump drive, some 80 per cent now have this arrangement. Cellular radiators have increased from 68 per cent to 76 per cent, and, of the tubular radiators making up the remainder, quite one-half are of the film variety, the tubes being flattened out so as to provide a water space of less than ⅛ in. width and 1 to 2 in. deep, the "pack" having radiating fins soldered on. Tubes of this type and also those of round section are invariably vertical.

A pressed steel radiator shell is used by only a single firm—Armstrong-Siddeley. Sheet brass, usually nickel-plated, is used in 63 per cent of radiators, though this represents an appreciable reduction since last year, for something like 30 firms are now using a white metal casing. The latter appeals to the owner when a polished radiator is provided, for although it tends to become dull more rapidly than nickel-plating, it can, like plain brass, always be brought back to something approaching its original appearance, even when neglected for comparatively long periods. Aluminum casings are in evidence, but only to the extent of 5 per cent.

Thermostatic control of water temperature is found only on the largest and high-grade chassis; Napier, Straker-Squire, Leyland and Rolls-Royce have it, the latter firm having adopted it only quite recently.

Engine Mountings

The great majority of British engines (75 per cent) are mounted directly in the main frame; four-point attachment is most in evidence, the three-point suspension in the main frame being found on only 27 per cent of chassis. Where subframes are used the engine rests upon the latter at three points. Subframes themselves have four points of support in 65 per cent of cases, three-point in 15 per cent, and are secured to the main frame at six and even eight points in isolated cases.

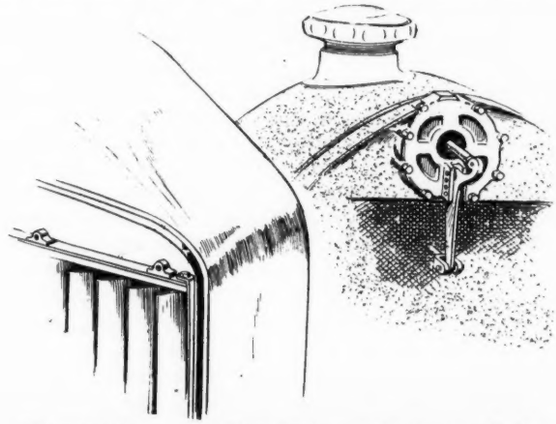
A greater number of British engines for 1922 have aluminum pistons, just a third of the total being so provided, as compared with 26 per cent last year. Cast-iron pistons make up most of the balance, though there are two examples of steel pistons and one a built-up type of cast iron and aluminum. The slipper type of piston and also the hour-glass pattern have made no headway, and 88 per cent of cast-iron and aluminum pistons are of the straight-sided variety. Most new engines have the piston pins floating in both rod and piston bosses, with aluminum or brass end plugs. At the present time the percentages of the various arrangements of the piston pins are: Fixed in rods, 23; floating, 32; fixed in bosses, 45.

Three compression rings are used in most cases, though in the smaller engines two are made to suffice, while in cars like the Lanchester, Napier and Sizaire-Berwick four rings are used above the piston pin. Rolls-Royce continues to use six. Fifty-six per cent of pistons have no special provision for preventing excess of oil from reaching the combustion chamber; 27 per cent use a scraper ring in the piston skirt; in 17 per cent the bottom compression ring is made to serve as a scraper by the usual means of a beveled lower edge to its groove with small holes drilled through to the interior.

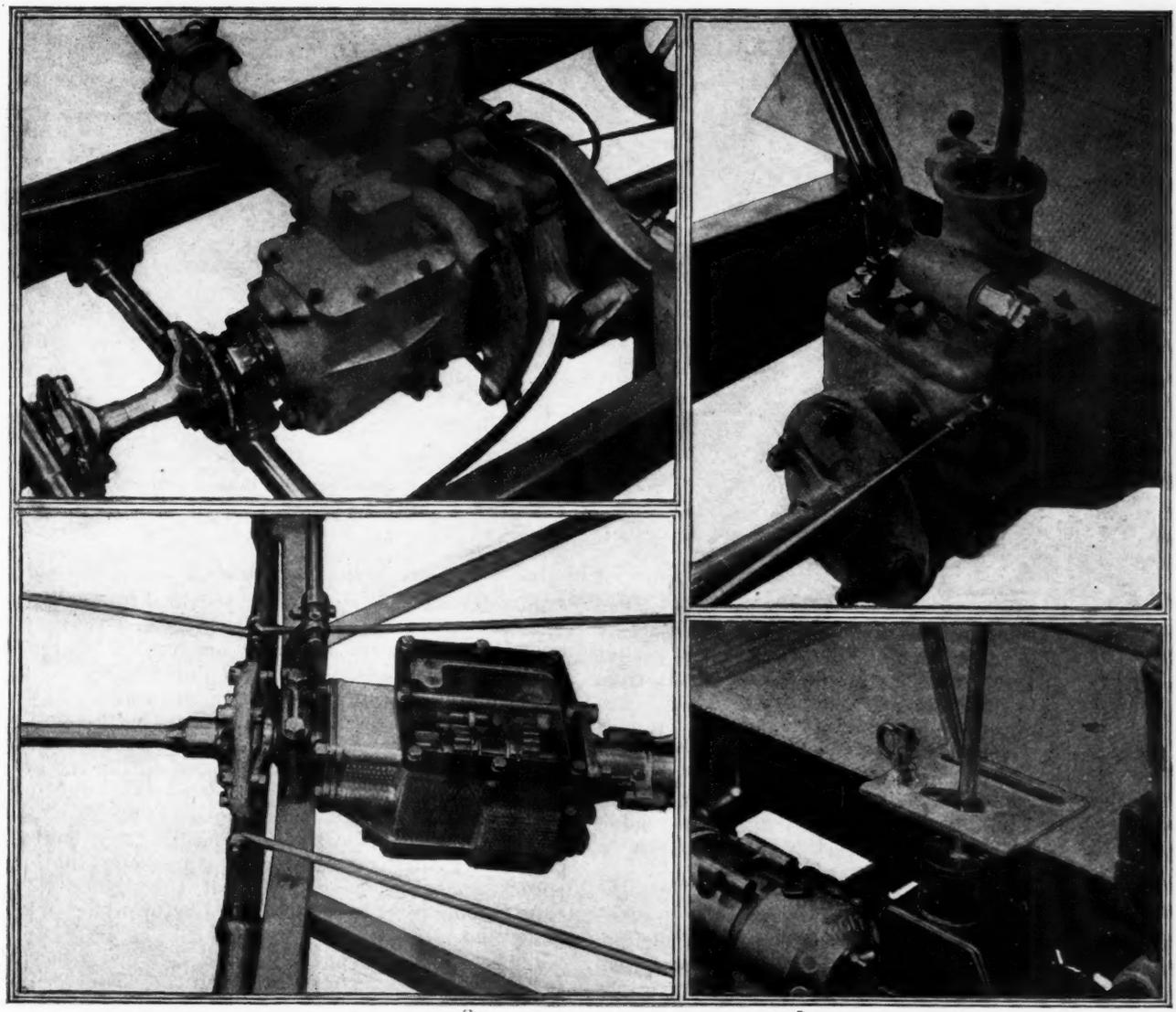
Engine Lubrication

There is a further increase this year in the number of engines having the hollow-shaft system of lubrication, for this appears with modifications in 57 per cent of engines as against 49 per cent last year; but only three makers use a full-pressure lubrication system by carrying leads from the big ends to the piston pins. The circulating splash arrangement has given way appreciably and at present is used on only 18 per cent of British cars. Twenty-two per cent have a combined trough and pressure system in which direct leads from the pump circuit are taken to the main shaft journals and frequently also to the camshaft bearings. In some of the miniature cars a simple splash system is depended upon, the supply of lubricant in the crankcase being replenished occasionally by means of a hand pump within reach of the driver.

Gear pumps are still by far the most popular, the plunger variety being found on only 24 per cent of engines, approximately the same as last year. The vane pump is used in four engines only. Standard, in the new 8-hp. model, has a sheet metal disk of approximately 12 in. in diameter attached to the rear flange of the crankshaft, within a narrow compartment at the rear of the crankcase. It has tongues cut at several points in its circumference, and in rotating it lifts the oil to



Thermostat on Straker-Squire operating radiator shutters is located within a casing projecting into the radiator top tank



(Upper left)—Enfield-Allday gearset with three-point trunnion support. Drum of external shoe brake is enclosed within casing extension for spherical housing of torque tube. (Upper right)—Three-speed gearset at front end of torque tube on new 8 hp. (67 cu. in.) four cylinder standard. Drive shaft passes through centre of spherical trunnion support. (Lower left)—Pedestal above gearset of Galloway chassis to form gate, with reverse stop, for spherically mounted gearshift lever. (Lower right)—Cast aluminum plate on Briton floorboard to carry hinged reverse stop for spherically jointed gearshift lever

inclined galleries, enabling the lubricant to run to troughs under the big ends. This, of course, is merely a variation of the flywheel system of lifting the oil, which system, by the way, appears for the first time in a British car of new make.

Last year approximately 40 per cent of British engines had the oil pump located either at the end or the side of the camshaft, but now 77 per cent have this unit submerged in the sump driven by vertical shaft and helical gearing from the camshaft.

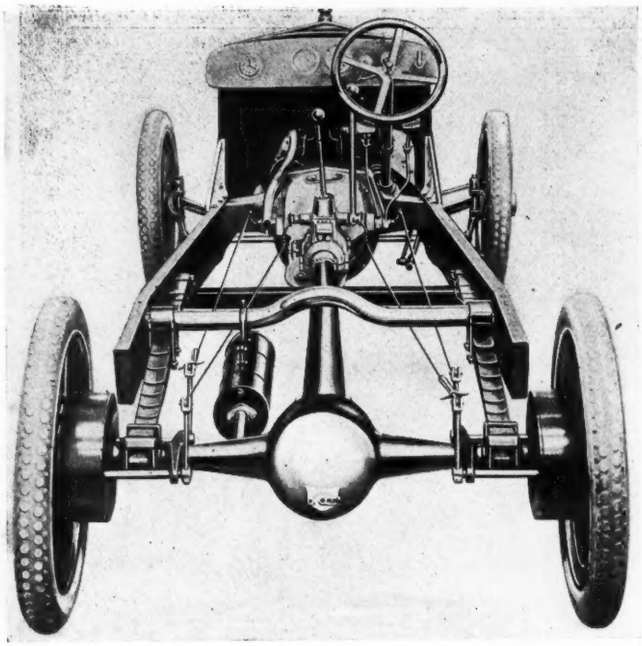
Inaccessibility of the crankcase oil filter is a subject for frequent criticism by users; they are told by makers, especially those who use hollow crankshaft lubrication, to inspect and clean their filter gauzes frequently, and yet no attempt is made by the majority of designers to facilitate this operation, which usually means crawling under the car to remove the flange nuts holding the filter in place.

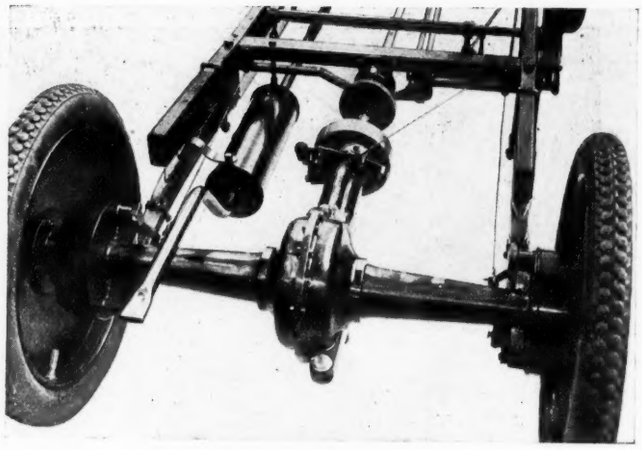
Carburetion

The Zenith carbureter is by far the most popular type, the horizontal pattern being used in most instances. In a few instances the new triple venturi model is adopted. Thirteen per cent of engines are fitted with the car manufacturer's own carbureter. The Claudel is used on 9 per cent of engines as against the 58 per cent of the Zenith.

In two engines out of three the carbureter is on the right of the cylinder block, the valves being on the left in accordance with predominating European practice. Not always, however, does this arrangement imply an induction passage through the block, for only 40 per cent of the total number of engines have this feature. In some cases the inlet pipe passes either over the cylinder block or around the front of it, both of which are obviously undesirable arrangements.

Vaporization appears to have received rather more attention than hitherto, and the writer observed eleven different provisions to this end. The most favored plan is to depend solely upon heat absorption through the walls of the inlet passage through the cylinder block, but this provision is supplemented in 11 per cent of cases by an integral inlet and exhaust manifold, in 5 per cent by a water jacket, in an equal number of cases by a hot air supply and in one instance by a water jacket and an integral manifold. In the 16 per cent of engines having integral inlet and exhaust manifolds alone to assist vaporization, the attempts to embody a hot-spot





(Left)—Rear view of 18 hp. Phoenix. Production only now commencing, having been intentionally held up for 12 months owing to state of trade. (Above)—Semi-enclosed propeller shaft on new 9 hp. Belsize. Coupling shaft has rear bearing on crossmember

are distinctly crude in the eyes of those who realize the potential benefits of such an arrangement properly carried out.

The vacuum system of fuel feed has increased from 30 to 39 per cent since last year, gravity feed has fallen from 56 to 54 per cent and pressure systems have dropped from 14 to 7 per cent. It will be realized from the foregoing that the gravity system is still the most popular. Generally speaking, complaints as to the derangement of the vacuum tank have been infrequent, and the additional expense of installation is the chief obstacle to the more extended use of vacuum feed.

Electrical Equipment

The magneto retains its predominance among British cars appearing, as last year, on nearly 90 per cent. On Rolls-Royce, Napier, Lanchester and one or two other top-grade cars both magneto and battery are still supplied, but the battery system alone is found on less than half a dozen of new cars, including the little Standard, the 14-hp. Sunbeam and one of the Talbots. Wolseleys have battery ignition on three models, but in the case of the two post-war types which were introduced at the show of 1919 magnetos appeared in the production models only quite recently.

The battery system used by Wolseley is made by a subsidiary company which was formed during the war to take over the Bosch stock and good will in England, and unless it may be assumed that Wolseleys imagined that the British public was not sufficiently educated up to a battery ignition until recently, it must be inferred that the equipment it was proposed to use has not been sufficiently tried out.

Two-unit equipment for lighting and starting is found on 91 per cent of British cars. The single-unit motor generators are almost invariably made by Lucas and driven by silent chain from the distribution gearing. The 12-volt system is the most popular in the proportion of 2 to 1, and the majority of the 6-volt sets are fitted to small cars without electric starter. Ground return wiring is rare.

In three or four of the miniature cars a hand-operated mechanical starting device is fitted, this addition to the usual starting crank allowing the crankshaft to be rotated half a revolution at a time from the driving seat, a third lever on the right being provided for the purpose. The new 8-hp. Standard has an arrangement of this kind, which consists of a rack and pinion located near the front of the crankshaft, the pinion being cut on an over-running clutch for the starting crank. The rack has a gap at the end of its range of teeth, this gap lying under the pinion when the engine is running normally, so that the clutch is only in operation during the process of starting. Something of this kind is found also on the Armstrong-Siddeley sixes, though in these an electric starter is used. The latter drives the front end of the crankshaft through chain and sprockets, the driven sprocket moving axially when it commences to turn, causing clutch teeth to be engaged before the crankshaft is rotated.

Last year 80 per cent of British cars had a belt drive for the generator, a feature which the writer criticized severely at the time. It is worthy of note, therefore, that this percentage has now decreased to 62. Quite an appreciable number of entirely new models, however, have belt-driven generators.

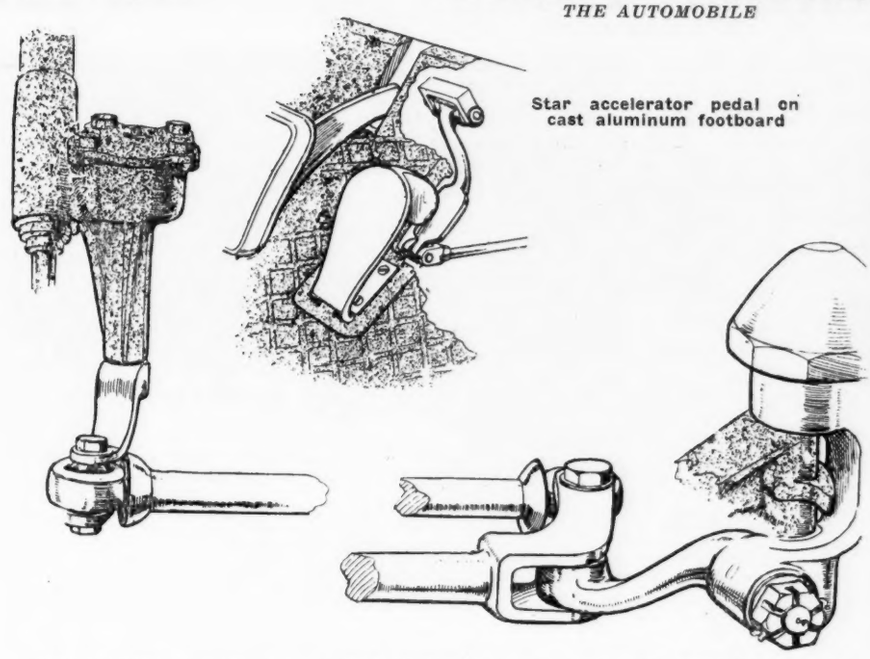
Engine Bearings

For six-cylinder engines the seven-bearing crankshaft is in the majority; 18 per cent have three journals only and 35 per cent four. Engine dimensions have seemingly no influence on the number of bearings except in the largest motors, for while the new A. C. and Singer sixes, with 2 9/16 x 3 15/16-in. cylinders, have four journals each, the 18- and 30-hp. Armstrong-Siddeleys have only three apiece.

In four-cylinder engines three crankshaft bearings are most common, appearing in 60 per cent of cases. Two only are next in favor, while five journals are used in 10 per cent; the smallest engine having five bearings is the new 12-hp. Austin, a similar number being used in the 20-hp. model.

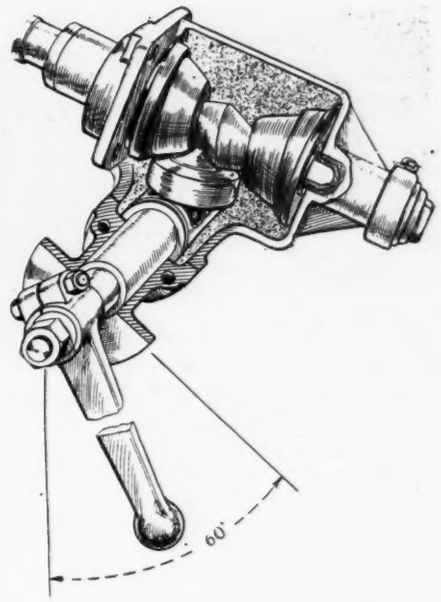
Plain journal bearings are almost universal, ball bearings being used in only 6 per cent of engines, ball and roller in 5 per cent and roller in 1 per cent. The majority of these diversions from standard practice are met with in engines of from 70 to 100 cu. in. displacement.

Three is the usual number of bearings for the camshaft, though 29 per cent of engines have only two,



Star accelerator pedal on cast aluminum footboard

Enfield-Allday steering; has vertical shaft for worm wheel with transverse rod to left hand swivel



New type of Marles steering gear

while 21 per cent have four. In three engines five camshaft bearings are used and in four engines seven, all the latter being six-cylinder jobs.

Camshaft bushes are of phosphor bronze in approximately half the total number of engines and white metal in a third. There are 9 per cent of cast iron, 6 per cent of ball and 3 per cent of ball and phosphor bronze bearings combined. One engine has a ball bearing in the front cover of the cam gear housing and three plain bushes spaced along the crankcase.

Comparatively few gearsets have other than ball bearings for the mainshaft and layshaft; only one has plain bushes for both shafts, though 14 per cent of layshafts have phosphor bronze bushes at both ends. Roller bearings are fitted on only 9 per cent of mainshafts and 6 per cent of layshafts, though one maker uses for the latter a ball bearing at one end and a roller bearing at the other. Plain bushes are, however, preferred to ball bearings for the pilot bearing, though in half a dozen cases these are of the floating bush type. Lubrication of this bush is generally provided for by a hole drilled through the constant mesh pinion at a point between two of the teeth, so that the engagement of the gears in rotating provides a pumping effect, driving the oil into the pilot bearing.

But, despite the predominance of plain bushes for the pilot, the use of ball bearings is increasing; they are now found in 30 per cent and roller bearings in 8 per cent of gearsets.

When roller bearings are used in gearsets they are usually of the cylindrical type and usually supplemented by a ball journal at the front of the constant mesh wheel on the main shaft. As regards prevention of oil leakage from transmission cases, the popular method is a felt gland at each end of the main shaft, though this in a few instances is supplemented by the familiar thrower ring type of oil guard outside the gland.

Wheel and Axle Bearings

Ball bearings are again the most popular in both front and rear wheels, and the combined radial and thrust type is almost universal. Roller bearings, usually the Timken variety, are fitted, however, in 27 per cent of front wheels and in 17 per cent of rear wheels. One ball and one roller bearing, the latter of the cylindrical type, are fitted in 9 per cent of front wheels and in 6 per cent of rear wheels, full floating rear axles invariably accompanying this combination.

At each side of the differential casing ball bearings also predominate; Timken rollers form the majority of the exceptions, which aggregate 15 per cent. Only 7 per cent of rear axles are of the non-floating type and these are mostly on quite small cars; of the remainder, 51 per cent are full floating.

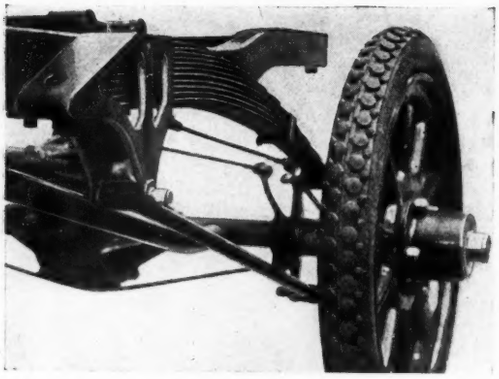
Clutches

While the cone type of clutch in its several variations constitutes 52 per cent of the total number. this represents a small decrease as compared with last year. The majority of the loss has gone toward the single dry plate type, though there are 14 per cent of multiplate clutches as compared with 12 per cent last year. Three of the cone clutches have metal-to-metal friction surfaces, aluminum to cast iron, running in oil. Phoenix has been a continuous user of the latter arrangement for ten years or more, and embodies it in the new 18 hp. model.

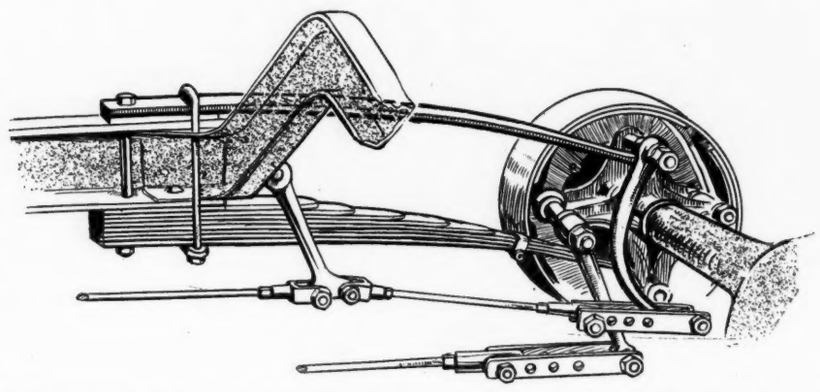
Rover is still the only maker using single plate clutches running in oil and even in this case a dry fabric friction surface is used in the 8 hp. chassis.

Wolseley for many years past has used nothing except the multiplate in oil type of clutch and still retains it on three models, though the new two-cylinder chassis has an inverted cone with a fabric lining. Vauxhall has adopted a dry plate pattern for the new 14 hp., retaining the multiplate in oil type for the larger models. Belsize in a new 9 hp. chassis with the Bradshaw air-and-oil-cooled engine has adopted a multiplate in oil clutch. Armstrong Siddeley continues a dry multi-plate clutch on the new and smaller model (18 hp.), but has a dry single plate in the new Stoneleigh light car. In this case, the driven disk is of fabric and merely has a steel boss floating on the front end of the splined coupling shaft, for which it forms the front flexible joint.

From the foregoing it will be gathered that the dry single plate clutch is making most headway, though in a good many quarters the objection is still raised against it that the thin metal disk is liable to warp and cause



Peculiar mounting of rear quarter elliptic spring on new 14 hp. Turner with parallel radius rod



Rear springing of 7 hp. two-cylinder Wolseley. Single upper blade assists in taking torque and drive

fierceness and chattering if it should be slipped much.

The cone clutch has the merit of simplicity and when fabric covered can stand an indefinite amount of slipping. Gear shifting is no more difficult with the best examples of cone clutches than it is with the best of the single plate type. This is possibly due to the extensive use of aluminum for the driven cone, although in quite a number of instances a pressed steel driven member is used.

Transmissions

Seventy-three per cent of all dry clutches, cone and plate, have fabric facings, but leather as a friction material is still in evidence in the cone type to the extent of 13 per cent. Cork inserts are used by one maker (Morris) in a double plate clutch and wood as a friction material has actually appeared in a new make of car.

Ball journals for the pilot bearings of clutches are still comparatively rare, the vast majority being plain bushes. Ball bearings for the clutch yoke are, however, universal.

The unit power plant construction has made no appreciable headway since last year, and only 27 per cent of British cars have it. The amidships location is still in the majority, but it has fallen from favor during the year as the present percentage being 56, as compared with 68 last year. Three additional makers have adopted the plan of forming the gearset as a unit with the front end of the propeller shaft and the unit gearset and rear axle construction appears on 10 per cent of cars, as compared with 6 per cent last year.

Selecting 24 new models shown at Olympia, it is found that 7 of them have an amidships gearset, 10 have a unit power plant, 5 have the gearset a unit with the propeller shaft, and 2 with the rear axle. Thus, of the two dozen, 17 avoided the unit power plant arrangement.

Last year the number of gearsets with three and four speeds respectively were exactly equal in number, but this year 58 per cent have three speeds. The favored position of the gear-shift lever remains on the right-hand side of the chassis, 70 per cent being so placed and 29 per cent central. One maker—Vulcan—on one model makes this item optional. Of 24 new cars, 13 have the gear-shift lever on the right.

Where the gearset is amidships, the coupling shaft from the clutch has a fabric disk joint at each end in 46 per cent of cases. Metal disks and leather disks are in evidence to the extent of 4 and 13 per cent respectively. All-metal joints (usually a pot joint at the front to allow for the sliding movement of the clutch and a star joint at the rear) occur on 20 per cent of coupling shafts, while 17 per cent have merely a sliding coupling at the front end and a Hooke's joint at the rear.

The steel worm and phosphor bronze complete worm wheel type of steering predominates, being found on just over half the total number of cars, the worm and segment on 26 per cent. The remainder are divided between screw and nut (8 per cent), epicyclic, rack and pinion and volute cam. The Marles, which is of the latter type, has been considerably altered since last year, now having only one ball bearing forming a roller mounted on a projecting boss of the lever shaft, instead of two ball bearing rollers as last year actuated by the snail cams. This year's model has two volute cams with their small diameters united, and these take effect simultaneously on the ball bearing roller at diametrically opposite points of its circumference. This new model gives a quicker steering than the old, and, like the original, is reversible; but users find it quite as precise and controllable as the other, while it has the merit of being a far better manufacturing proposition according to the firm handling it.

Rack and pinion steering gears are used only on the smaller types of chassis, such as the 8 hp. Rover.

Propeller Shafts

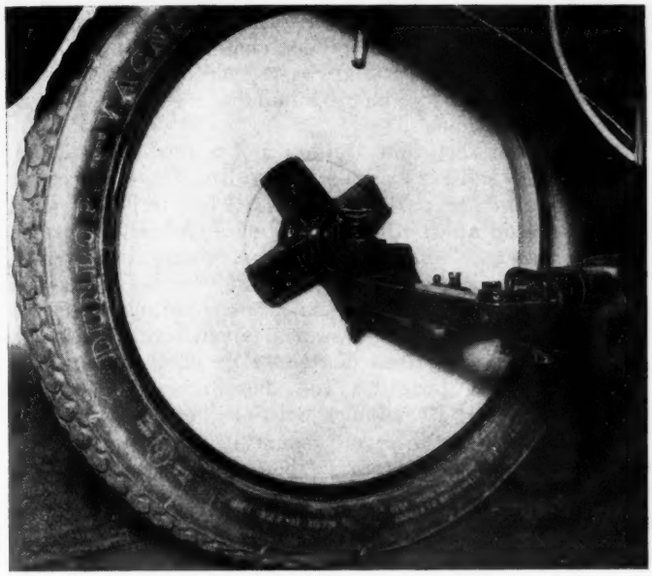
The open propeller shaft with Hotchkiss drive has gained slightly during the year, being used now on 52 per cent of British cars. The enclosed pattern has receded slightly and the same applies to the semi-enclosed arrangement, in which a short open coupling shaft is interposed between the gearset and the enclosed propeller shaft proper. Wolseley is the main exponent of this latter system.

With enclosed and semi-enclosed shafts, the star (cross) type of universal joint is fitted at the front of the enclosed portion in 64 per cent of cases, a fabric disk in 23 per cent and a sliding pot joint in 3 per cent.

Open propeller shafts have a fabric disk joint at each end more often than last year, this arrangement having increased from 28 to 40 per cent. Next in favor (29 per cent) is a cross joint at the front and a sliding pot joint behind. Daimler is the only maker using cross joints with ball bearings, one at each end of an open shaft, and one firm, Enfield, uses roller bearings for this type of universal.

It may be mentioned incidentally that the use of fabric disk joints for propeller shafts is increasing mainly in connection with cars up to 12-15 hp. In some cases the flexibility of the disks is alone depended upon to take up variations in centers due to the flexing of the springs, though where the disks are not more than 48 in. apart the star piece of one of them is allowed to float on the end of the splined shaft.

As might be expected the spiral bevel has still further gained on the straight bevel for the final drive in



Cast cruciform hub flange of channel section on new Standard light car with disk wheels

the rear axle, occurring in 63 per cent of chassis as compared with 46 last year, while the straight bevel has receded from the 28 per cent in 1920 to 13 per cent now. Not much variation has occurred, however, in the number of worm drives; 12 per cent of chassis now have a top worm and an equal number a worm below the axle, this total of 24 per cent comparing with 26 per cent last year.

Where the drive and torque are not both taken by the springs with an open propeller shaft, the springs to take the drive and a torque arm are the usual combination; both radius rods and a torque arm are used in only one car. Vauxhall has the former arrangement in two models and Wolseley in the 20 hp. six-cylinder chassis. In the Napier Six, the new 14-hp. Vauxhall and the 10 and 15-hp. Wolseleys, having either an enclosed or a semi-enclosed propeller shaft, the springs are made to serve for transmitting the drive, the propeller shaft casing absorbing the torque only.

Brakes

The percentage of chassis with both brakes on rear wheel drums has increased from 61 per cent to 68 per cent since last year, though there is only one car having internal shoes and contracting bands on the same drum. Transmission brakes, therefore, are found on 32 per cent of cars, these being mostly of the external shoe type, and only Daimler has an external band brake on the wheels accompanying an external shoe brake on the transmission.

The increase in the use of steel cables for brake operation, which was apparent last year and was regarded by many as a retrograde step, has continued, and this feature is now coming to be taken as a justifiable alternative to rods, if not actually preferable in certain respects. Usually the cable ends are adjustable without great difficulty, and in a few instances they are more or less permanently secured in the eye of a threaded solid extension to allow for a finger nut adjustment.

Only one British car is fitted with front wheel brakes —the Sheffield Simplex six-cylinder, introduced at last year's show. This car has not yet gone into production and has poor prospects of reaching that stage for awhile; yet it was again at Olympia this year—the selfsame chassis with front wheel brakes added!

Half-elliptic springs all around is a combination more in use than any other, though it has decreased from 48 to 43 per cent since last year. Next in popularity is the combination consisting of half elliptics at the front and cantilevers at the rear, viz., 22 per cent, a gain of 1 per cent. Quarter-elliptics at both back and front have increased from 16 to 20 per cent, while half and three-quarter elliptics together have dropped from 15 to 12 per cent. There is only one British car with transverse inverted half elliptics; another rare combination is found on the new 9-hp. Vulcan, which has three half-elliptics on each side, the front two being inverted—each mounted like a cantilever on a central trunnion bearing—the inner ends of these two being coupled by the third similarly arranged.

Wrappings for springs—either leather "gaiters" shaped to fit or specially prepared tape wound on from end to end—are being widely used, being not only bought as accessories and fitted by owners to existing cars, but also supplied as standard by many makers of cars, large and small.

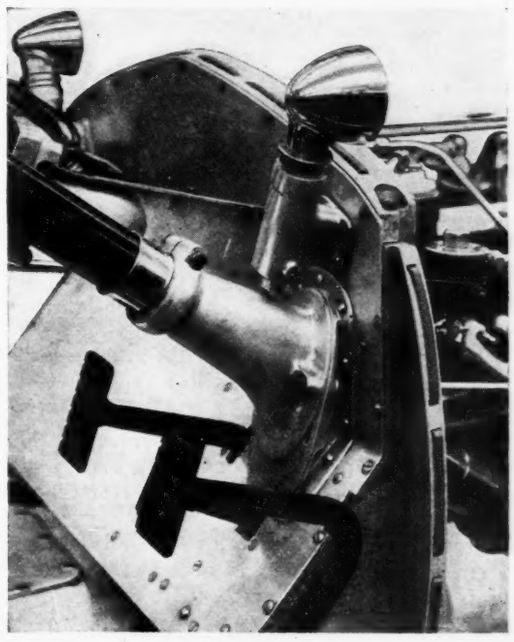
Some wrappings are fitted after the contact surfaces of the spring leaves have been polished but left dry, while others constitute grease bags to keep a supply of lubricant between the leaves. In the former case the gaiters merely serve to prevent the entry of water and the formation of rust on the contact surfaces and thus prevent deterioration in the suspension system. In the other case, they again exclude water, but also reduce the frictional effect and counteract the comparative harshness of somewhat inflexible springs.

Wheels and Tires

The hollow pressed steel wheel again leads (48 per cent), but it has lost ground during the year to the disk type to the extent of 8 per cent. Disk wheels are used on 29 per cent, wire on 18 per cent and wood on 5 per cent.

Originally the only pressed steel wheel available was the Sankey, but now there are several other firms making this kind of wheel, including Dunlop and Goodyear (no connection with the tire company).

The Goodyear wheel is different from the Sankey in that it has a separate rolled steel rim which is welded



Lanchester aluminum dashboard with side lamps of ship's ventilator pattern normally projecting through cowl

into the halves of the main portion of the wheel. An advantage claimed for this arrangement is that air pressure within the tire does not impose an outward stress upon the welded joint, the tire and rim as a unit being self-contained in respect to inflation pressures. Until this year the writer viewed this claim as having no force in practice, whatever might be said of it in theory; but he has within the past six months experienced two cases of cracked wheels of the original type which had split around their circumference under the air tube. But the faults appear to be due to faulty welding rather than to the failure of a good joint, and they were brought to a head, no doubt, just as much by vibration and driving stresses as by inflation pressure.

With quieter final drives by reason of helical bevels taking the place of straight bevels, one hears less frequent complaints against the disk wheel on account of its resonant effect. But, nevertheless, it is open to that criticism when indirect drives are in use—which is the case a considerable portion of the time in the small-engined cars.

An unquestionable advantage of the disk type is the ease with which the designer of the car can provide central pivot steering, the dishing of the wheels allowing the swivel axle pivots to be arranged vertical and central over the point of tire contact with the ground. Quite a number of new cars have this arrangement, which is undeniably of assistance in securing ease and precision in steering control. In one or two cases, however, the front wheels are still splayed slightly, despite the central pivot, which is, nevertheless, still kept vertical. But, as a rule, the wheels also are vertical.

Wire wheels are most used at the extreme ends of the scale of car sizes; on the largest and on the smallest. They are almost invariably detachable and in this connection Dunlop and Rudge have introduced detachable wire wheels held in place by bolts the same as pressed steel and disk wheels.

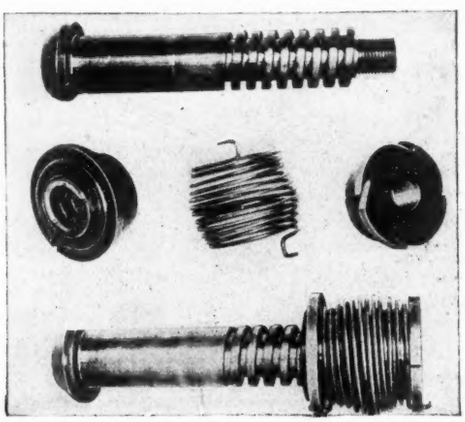
Despite the fact that Dunlop and a few other British tire makers have standardized a line of straight-side tires, the clincher pattern is still all but universal; only Beardmore on an 11-hp. chassis has adopted the alternative. This must be a disappointment to the importers of American straight-side tires, for they have made great efforts during the past 12 months to popularize this type by propaganda in the press and elsewhere. It follows from the foregoing that demountable rims are still foreign to British practice, the detachable wheel being used even on the Beardmore with the straight-side tires.

The cord tire is, however, assuming a certain degree of popularity, due mainly to its being supplied by Dunlop as an alternative to the fabric variety and to extensive propaganda and advertising of the Michelin "Cable" tires. Only few car makers have standardized it for next year, and those that have done so are using it instead of fitting a larger size of canvas tire to the wheels of chassis with sedan and other types of closed bodies. The 11.4-hp. Humber, for example, has 760 x 90 m.m. fabric tires on the open cars, and the same size in cords on the coupé and four-passenger sedan.

Dunlop having adopted the Schrader valve, the latter appeared on a large proportion of British cars for the first time—for Dunlop tires are standard with 90 per cent of British car makers.

Self-Adjusting Connecting Rod Bolt

A CONNECTING rod bolt which automatically takes up wear in the bearing as fast at is occurs has been placed on the market by the V. & S. Automatic Bolt Co. The bolt is provided with an "Acme" left-hand thread for the revolving nut and a right-hand "V" thread on a smaller diameter at the end, for the spring-lock nut. The revolving nut is provided with a chamfered face on the contact side (toward the cap of the connecting rod) and is sufficiently free on the bolt to offer slight resistance to rotation in taking up wear.



A self-adjusting connecting rod bolt

The force required for making the adjustment is derived from a spring, which is attached to the revolving nut and is of the barrel type. In a spring of this type the center coils are the weakest and do most of the work when only moderate tension is required. The revolving nut cannot back up.

The spring-lock nut is provided with four adjustment slots so that any desired spring tension may be obtained, and has a right-hand thread, which, with the spring tension pulling to the right, locks it on the bolt.

The installation is made by removing the engine underpan, exposing the connecting rod bearings and removing all caps and bolts. If shims are used they are removed; otherwise a space of at least 1/16 in. is provided between the cap and rod by filing that amount from the cap faces. This is necessary in order to permit the bolt to function properly.

The bolt holes in the cap are then reamed 0.005 in. larger than the bolt to be used, following which the underface of the lugs of the cap are end-milled sufficient to provide a space of 1/32 in. between the revolving nut and the spring lock nut. This prevents interference and undue splash and also provides a smooth surface for the revolving nut of the automatic bolt.

The preparations completed, the bolts are inserted in the rod, the caps placed in position, the revolving nuts attached by finger pressure only, and the spring lock nut is then placed on the end thread and tightened against the shoulder of the bolt by the small spanner wrench provided. The hook of the spring is then engaged in one of the four tightening or adjusting slots of the spring-lock nut by means of a small wire loop on the handle of the spanner wrench, and is brought to proper tension, which is determined by the "feel" as in fitting bearings by any of the other methods. It is said not to be necessary to burn or scrape in the bearing.

It is claimed that the use of these bolts insures better crank-pin bearing lubrication, as the space previously occupied by the shim now permits more oil to reach the bearing surfaces, and if the bearings are properly chamfered a valley is formed for the storage of oil.

The Navy Racer Which Won the Pulitzer Trophy

Biplane which now holds the world's record for any closed course was designed and built complete, engine included, in the Curtiss plant. Many interesting engineering features incorporated in this all-American product.

By Herbert Chase

THE Curtiss navy racer which recently won the Pulitzer Trophy at Omaha was designed and constructed complete in the plant of the Curtiss Engineering Corporation. We are informed that the machine was conceived about June 1, 1921, that one machine was completed and ready to fly about August 1, and a second on August 8. When it was finally decided that the navy would not enter a plane in the Pulitzer race the Curtiss company secured permission (about ten days before the race) to enter one of these machines. It was flown in the race by Bert Acosta and covered the 153.59-mile, five-lap triangular course, including 14 turns, in the time of 52 minutes 9 seconds, or at the rate of 176.7 m.p.h. This constitutes a world's record for competition over a closed course and is officially recognized as such by the Aero Club of America. The previous record for the same trophy was won by a Verville-Packard about a year ago, when the course was covered at an average speed of 156.5 m.p.h.* We are informed that the previous record for closed course competition was made in France in October of this year, when a Nieuport-Delage monoplane made an average speed of 173 m.p.h.

The Curtiss Navy Racer which won the recent Pulitzer Trophy race at Omaha, covering the five laps of the 153.59 mile triangular course at an average speed of 176.7 m.p.h.

The Curtiss navy racer was designed primarily as a racing machine, to be used in part as a means of testing the new Curtiss C. D.-12 engine, but the design is such that the machine can, with slight modifications, be arranged for mounting a machine gun, and thus be suited for use as a high-speed pursuit plane.

There is nothing radically new in the design of the plane, but it incorporates a number of refinements and is, of course, arranged to minimize head resistance. The wires are all of streamline form and all exterior fittings have streamline coverings. This applies even to the radiator piping, which in the accompanying cut is shown exposed. The cockpit opening has also been made smaller than shown in the cut. The Lamblin radiators shown are the only parts not made in this country, and these may later be abandoned in favor of a wing-type radiator now under development by the Curtiss company. All the major units of the plane, including the engine, are made in the Curtiss plant.

Most of the wing covering is of ⅛-in., two-ply veneer, which is used as a structural member, though the trailing edge of the upper wing is covered with linen. The total wing area is 168 sq. ft. and the wing loading, based on a gross weight of 2165 lb., is slightly under 13 lb. per square foot. A Sloane wing section is employed.

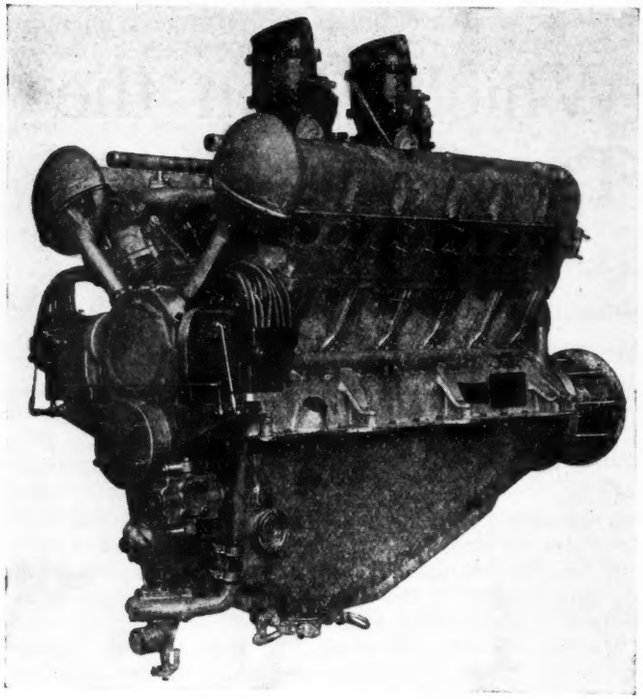
The plane weighs 1735 lb., light, and has a useful load of 430 lb. It is said to be capable of speeds in excess of 190 m.p.h. on a straightaway and to have a landing speed of about 70 m.p.h. The overall span is 22 ft. 8 in.; length, 21 ft. ½ in.; height, 8 ft. 11 in.

The engine is of the twelve-cylinder, 60-deg. V-type, 4½ x 6 in. (1144.8 cu. in.), and is said to develop 405 b.hp. at a normal speed of 2000 r.p.m. The propeller is mounted on the crankshaft. The engine cylinders are made as short as possible in order to facilitate good cowling. It will be noted that the fuselage has an excellent streamline form, in spite of the high-powered engine employed. The overall dimensions of the engine are: Width, 28¼ in.; length, 56¼ in.; height, 34½ in.

The engine is similar in general design to the Curtiss model K-12, described in AUTOMOTIVE INDUSTRIES for May 15, 1919, but incorporates the changes made in model C-6, described in the issue of July 29, 1920, and some additional changes. It will be recalled that the crankshaft is of the seven-bearing type, but the front bearing is made in two parts with provision for a large ball thrust bearing between the two, so that there are in reality eight main bearings. These are all 3 in. in diameter instead of 2¾ in., as formerly. All bearings are now of the bronze-backed type.

The lubricating system remains unchanged in princi-

*Last year's record was announced at the time as having been won at an average speed of 178 m.p.h. When the course was later surveyed it was found to be considerably shorter than originally figured, and the speeds announced correspondingly slower.



The Curtiss model C.D.-12, twelve-cylinder engine used in the Navy racer. It weighs 700 lb. dry, and develops 405 hp. at 2000 r.p.m.

ple. It is, of course, of the pressure type with direct feed to all main bearings. The crankshaft is bored out to make it light, but formerly the ends of the hollow main journals were left open and oil was conveyed to the crankpins by inserted pipes which registered with the oil duct in the main bearing at each revolution. The journal ends are now plugged and are run full of oil. Provision is now made for connecting an oil cooler when desired.

Ignition is furnished by two twelve-cylinder Berkshire magnetos, each of which fires a separate set of A. C. plugs, there being two plugs for each engine cylinder.

The engine used in the race was fitted with two Ball & Ball duplex carbureters. These are located well down in the V, but with the air inlets carried outside the cowling above the engine. Fuel is fed to the carbureters by a two-cylinder opposed plunger pump driven from the distribution gearing. The plungers are operated by a cam and Scotch yoke inclosed in a case which is kept filled with lubricating oil under pressure. Since the oil pressure is always greater than that on the fuel, no leakage of gasoline into the oil can occur, but slight amounts of oil can mix with the fuel.

The engine has a 6:1 to 1 compression ratio and consequently requires special non-detonating fuel. The fuel used in the race was aviation gasoline and benzol mixed in equal proportions. The engine is said to consume 0.50 lb. fuel and 0.008 lb. oil per b.hp.hr. and to weigh 700 lb. dry, or 1.73 lb. per b.hp.

The general specifications of the Curtiss navy racer are as follows:

Areas (in sq. ft.)

Upper wing panel	88.0
Lower wing panels without ailerons	80.0
Total wing area	168.0
Ailerons	18.0
Horizontal stabilizer (2)	12.6
Elevator (2)	9.2
Tail fin (1)	4.8
Rudder (1)	4.8

Dimensions

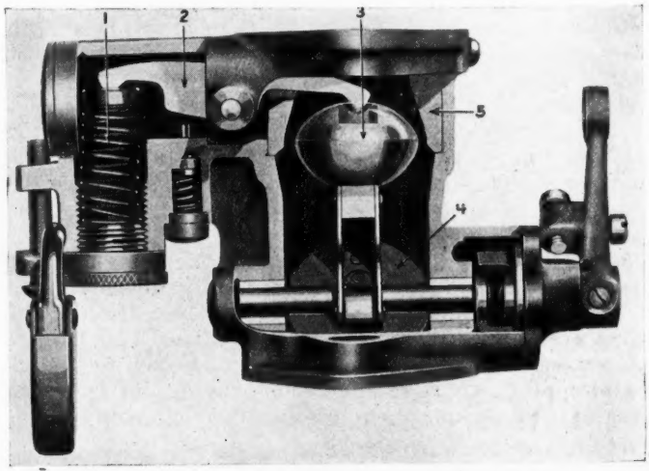
Span (overall)	22 ft.	8	in.
Length	21 ft.	½	in.
Height	8 ft.	11	in.
Length upper panel	22 ft.	8	in.
Length each lower panel	10 ft.	2¼	in.
Chord (all wings)		48	in.
Angle of incidence		0	deg.
Gap		48	in.
Stagger		15	in.
Dihedral (lower only)		2	deg.
Sweepback		None	
Tread of wheels		60	in.

A New Model Governor

A NEW model Monarch governor operating on the same principle as the previous model has been brought out by the Monarch Governor Co. The Monarch governor utilizes the kinetic energy of the moving gas in the intake manifold to operate the automatic throttling mechanism. It has only two moving parts and is completely automatic. Referring to the cross-section herewith, the governor comprises a coiled spring 1, with a rocker arm 2, and conoid 3, butterfly 4, and cone 5. The spring is so proportioned as to make possible a wide range of governed engine speeds. Adjustment is secured by removing the cap at the bottom of the spring housing and turning the slotted screw provided for this purpose. The rocker arm is provided at both ends with hardened ball point bearings that oscillate in hardened steel cups. It is fitted with an oil-and-wick lubricated bronze bushing.

The conoid or governing member 3, in conjunction with the cone 5, controls the governor action. Normally it is held wide open by the spring, the spring action on it being balanced by the pressure upon it due to the flow of charge from the carbureter to the engine. Any increase in velocity overcomes the resistance of the spring and causes the conoid to rise in the cone and close the butterfly.

While the principle is the same as that of the old model, there is no resemblance between the two in construction. Probably the chief advantage of the new model as compared to the old is that the spring tension or opposing force is now applied through the conoid instead of through the butterfly. This reduces the stress on the bearing surfaces and should result in a correspondingly longer life.



Sectional view of new Monarch governor

Some Unique Facilities for Crankcase Production

Continental Motors Corporation has recently retooled its plants with specially designed machines for the rapid and economical production of aluminum crankcases. One four-way multiple-spindle drill is arranged to bore 84 holes in a single operation requiring one minute to complete.

By J. Edward Schipper

THE Continental Motors Corp. has extensively retooled both its Detroit and Muskegon factories. This concern is now using some advanced special machinery for the manufacture of its line of engines, many of the tools and special machines being fixed-purpose types and non-adjustable to any degree, indicating the intention of the company to continue its present products on a quantity basis.

New buildings and improved machinery and tool equipment to the extent of several million dollars have been added to the Continental factories during the past several months, in spite of the general depression. The Muskegon plant, which is laid out to specialize in four-cylinder engines, has doubled in floor space, manufacturing equipment and capacity during this time. The new machinery and tools are intended to insure high standards of quality, uniformity and interchangeability. Perhaps no single department illustrates to better advantage the interesting possibilities of this new equipment than the crankcase division.

In this department there is equipment now being used which not more than 12 months ago manufacturing experts insisted could not be produced. This includes multiple-spindle tapping, automatic four-way drilling, rough and finish milling as many as twelve different surfaces at one time in the same continuously operating machine, and other equipment of equal interest.

The result of these improved practices is a marked advance in the possibilities of machining uniformity, high standards of accuracy and the maintenance of close manufacturing limits. For instance, one four-way, multiple-spindle drilling machine now does the same work as was done on five multiple-spindle machines. In fact, the railway type of installation perfected and used so successfully by Continental was described in AUTOMOTIVE INDUSTRIES at that time and was pointed out as being an extremely important development in crankcase manufacture. There were five machines along the line of railway and a jig traveled from one to the other on a track. This was a rotating, indexing type of jig, which permitted very rapid passing of the work from one multiple-spindle machine to the next. The new four-way, multiple-spindle machines perform 84 drilling operations at one time.

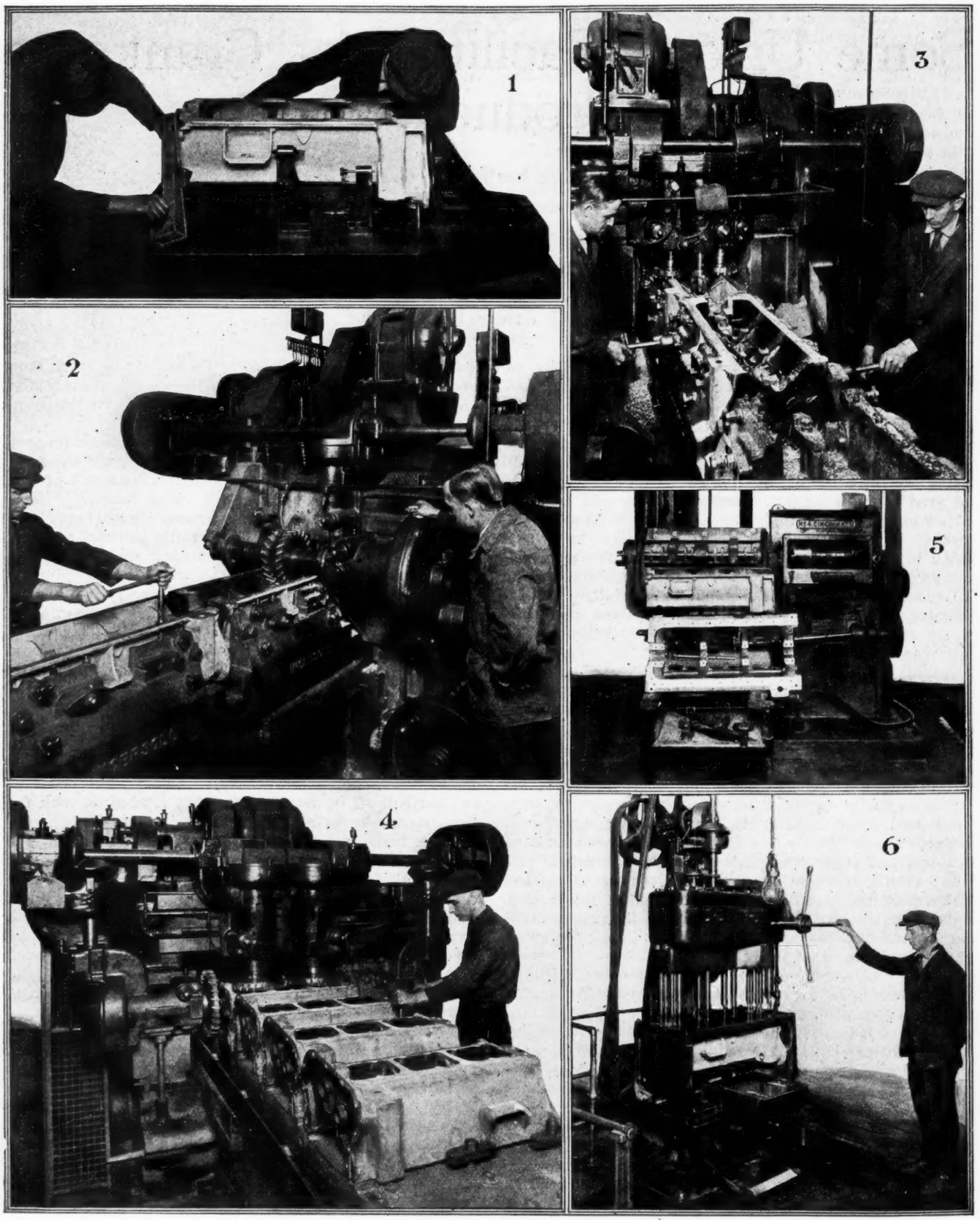
Another type of specialized equipment taps 56 holes simultaneously. Car and truck manufacturers who follow the progress of the industry will realize that this is a rather advanced step in aluminum crankcase manufacture. Two skilled operators can put a crankcase through the drilling operation along the railway system in three minutes, which is the actual capacity of the system, as there is no lost motion in passing work from one machine to the next. With the 84-spindle machine, one crankcase is drilled each minute with practically no manual effort on the part of the operator.

Crankcases are received in the form of aluminum castings with the steel oil tubes cast directly in the case. The steel oil tubes include a main oil lead and branch leads which run to each of the main bearings. This tube assembly or galley line is brazed together and then cast into the crankcase. The crankcase castings are, of course, sand castings, but are made from special metal patterns which are adapted to working with automatic molding machines and which insure castings having a uniform thickness of metal walls. The construction of the patterns, as well as the special molding machines, is such as to permit exceptionally close limits for foundry work. The cases are splendid examples of up-to-date foundry practice.

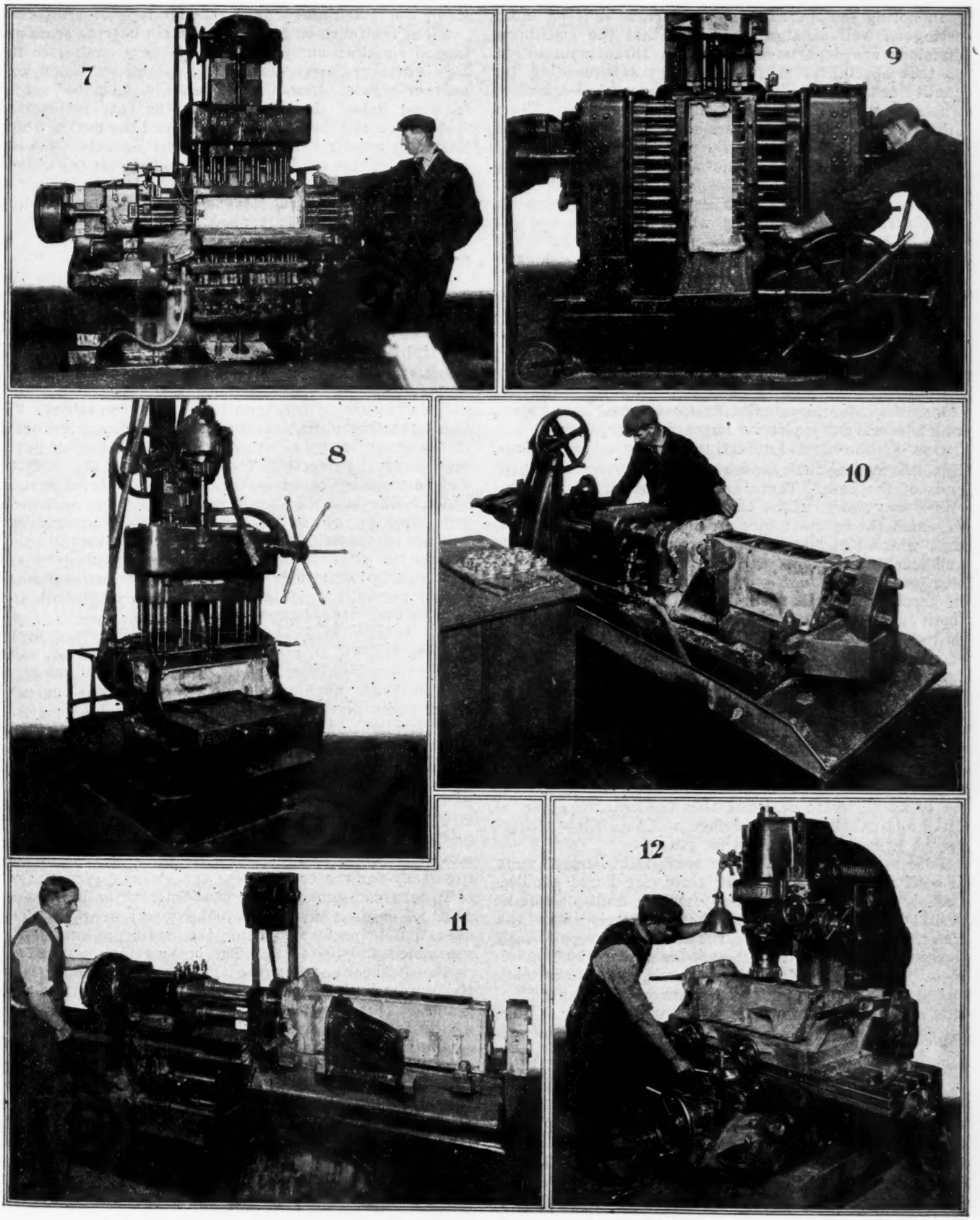
The crankcases are inspected on an inspection fixture, Fig. 1, to determine whether there is sufficient metal on all surfaces where machine work is to be done. One crankcase out of each foundry run is passed into a special inspection room, where it is carefully gone over and scribed off in detail to see that it accords with the dimensional limits established.

After inspection the crankcases are sprayed on the inside with a special solution known as enamel filler. This finely atomized spray thoroughly permeates the metal and takes on a sort of celluloid texture (after it hardens) which permanently seals the pores of the metal. The first actual machining operation is accomplished on a new type machine, Figs. 2 and 3, which is equipped with four roughing cutters and three finish cutters. Six cases are accommodated at one time on the reciprocating table, which has a quick return movement. The fixtures into which the crankcases are fitted are equipped with shims for leveling the case properly to take this initial cut. The machine rough and finish faces six different surfaces at one time.

The importance which Continental places upon the proper installation of the crankshaft is here plainly evident, as in this initial operation the first step is taken to assure the horizontal center line of the crankshaft being parallel with the upper and lower surfaces of the crankcase. An interesting feature in connection with the initial milling operation is that there are spring plungers beneath the projecting flanges of the case to stiffen them against the pressure of the cutters. As a result, smoother and more perfect machined surfaces are consistently maintained than would be possible with a less rigid support.



1—Gaging the raw crankcase casting for 7-R Continental engine before starting its manufacture. 2—Ingersoll continuous miller which takes four rough cuts and three finish cuts. This mills the main bearing surfaces and rough mills and finish mills the oil pan bolting flange which acts as a master locating surface in all subsequent operations. 3—Showing the finish cutting side of the same Ingersoll miller as illustrated in Fig. 2. 4—Milling the cylinder attaching surface on an Ingersoll miller and straddle milling endwise the 7-R Continental crankcase. 5—Straddle milling the main bearings on the 7-R crankcase in a No. 4 Cincinnati miller. The machine is shown above and a milled case below. 6—Drilling 15 holes for the crankshaft main bearing caps, distributor drive hole, oil slinger plate screws on a Foote-Burt multiple spindle drill



7—Four-way automatic Foote-Burt multiple spindle drill which drills eighty-four holes a minute in the 7-R crankcase. This is a non-adjustable tool solely designed for work on this case. It drills the four ways simultaneously. 8—A Foote-Burt multiple tapping machine which taps fourteen holes at once, taking care of the main bearing cap screw holes and others. 9—A three-way multiple tapper which taps fifty-six holes simultaneously. It was not long ago that a tool of this kind would have been considered an impossibility. 10—Cutting ten bearing surfaces for the crankshaft, camshaft, idler gears and water pump shaft simultaneously on a machine designed in the Continental plant. 11—Flycutting the bearing surfaces on the 7-R crankcase with a Continental designed machine. 12—Taking the light finish cut from the cylinder bolting surface of the 7-R crankcase. The location is by spindles which enter the end main bearings, giving proper distance from center line of crankshaft to finished middle surface

In noting the operation on crankcases it is an interesting as well as significant fact that the machining divisions are departmentized under three main heads, so that specialists are at all times safeguarding the quality of the finished product. There are the operators who actually supervise the machining operations. There are the expert machine setters who are held responsible for the accuracy of the work. They are the men who set up the machines for the work and who maintain their cutting accuracy. The operators do not do their own setting. They are only responsible for getting the work through the machines which have been set for them by the men who specialize in this important work. The third department is that of maintenance, which is solely concerned with the upkeep of the machinery.

The large output of the Continental plants makes it possible to especially design and adapt each machine to but one definite operation, and to maintain the functioning of each machine continuously day after day on the one kind of work. This permits of commercially maintaining exceptional machining accuracy and accounts for the close limits on Continental blue-prints, which would otherwise be impossible in quantity.

One of the next interesting machining operations, Fig. 4, is milling the cylinder attaching surface and both ends of the case. There are four cutters on this machine, two above, which take care of the upper surface to which the cylinder block attaches, and two side cutters, which straddle the entire length of the crankcase and machine it to its proper limits. The fact that the crankcases are handled in this way is very important in assuring interchangeability. The type of multiple-tooth cutters used and the cutting speed selected is such as to make possible true and uniformly machined surfaces. All cutters are designed and built by Continental.

Straddle milling is also used for the crankshaft main bearings. A miller adapted to this work, Fig. 5, with nine cutters takes care of all main bearings and also the oil slinger groove at the rear of the rear main bearing. Location is from the master locating surface and special locating gages. This method of location need not be repeated for each operation, as in every case the jig or fixture is so designed that the crankcase can be fitted against the master surface and accurately located by the gages provided for that purpose.

Fourteen holes for the crankshaft main bearing caps, as well as for the oil slinger plate, are bored simultaneously on a special non-adjustable, multiple-spindle drill, Fig. 6. The fixture used in this case is a box type. The simplicity of the fixture, the method of automatically locating the case against the master surface by a movement of the foot and the few seconds required to make the set-up are particularly interesting. The capacity of this machine drill is one case per minute.

Four-Way Multiple-Spindle Drilling

Following the crankshaft bearing cap seat drilling is the operation on the large, automatic, four-way drilling equipment which has been mentioned. These machines, operating with a closed box jig, drill four ways simultaneously, Fig. 7. The 84 holes are drilled in one minute. In the ordinary engine manufacturing shop anywhere from three to twelve multiple-spindle drills are required to perform the operation that this type of machine takes care of simultaneously.

It is equipment of this kind which can be used only where there is production of a standardized product in sufficient quantity necessary to warrant such an installation. It also is equipment of this kind which establishes accuracy and interchangeability. Each machine of this type is designed and built especially and exclusively for machining one particular type of crankcase.

All of the fourteen holes in the main bearing seats are tapped simultaneously on machines very similar to the type which performs the drilling operation, Fig. 8, and another type of three-way tapper, Fig. 9, takes care of 56 other holes. In this machine the case is inserted sidewise on end into the box fixture and the device which holds the master surface against the jig acts sidewise. Machines of this kind until just recently were considered impossible, but the phenomenal progress made in the science of specialized machines for engine building easily takes care of 56 tapped holes per minute.

Ten Bearing Surfaces Bored Simultaneously

After the bearing caps are put into place the ten bearing surfaces for the crankshaft, camshaft, idler-shaft and water pump driveshaft are bored simultaneously on special machines designed and built by Continental, Fig. 10. These give a rough and finish cut to the bearing surfaces. After a thorough cleansing, followed by an inspection, the main oil header is tested under pressure to see that there are no oil leaks. A finish reaming operation is given all the bearing seats in the crankcase to be sure that the bronze back bushings will seat perfectly. The bushings are then inserted and secured by brass screw dowels with countersunk heads. The bushings are pressed into place on a new type machine which has but recently been perfected. In these machines the bushings are protected while being pressed in place. Such improved equipment lines the bushings up with their seats so that the bushings are seated perfectly, maintained in correct alignment and held to their true diameters.

The babbitt-lined, bronze-backed bushings are flycut to size, Fig. 11, on machines which not only take care of the main bearings, but also take the finish cut from the camshaft bushings, idler gearshaft bushing and water pump driveshaft bushing.

A very light finish cut is taken off the cylinder bolting surface of the crankcase. The machines on which this operation is performed, Fig. 12, are designed and equipped to assure the utmost accuracy in the location of this surface with respect to the crankshaft and particularly to insure its being parallel with the horizontal center line of the shaft. The cases are then washed and all bushings line-reamed, after which the crankcases are ready for the crankshaft.

To assure alignment there is an interesting final operation. This is a flycut on the flywheel housing. The operation is performed after the engine is completely assembled and belted in. The cutting tool is attached to the flywheel and is driven through the crankshaft of the engine. This trues up the transmission bolting flange so that it is perfect with respect to the center line of the crankshaft and so that its bolting surface is at a true right angle with the shaft. This is an important factor in securing good operation of clutches.

In following the work through and recording its progress a pad of tickets is attached to the case when it starts through the manufacturing processes. As each man finishes his work he tears off one of these tickets, which gives the part number and the division which is taking care of the work; that is, such as crankcase machining, crankcase assembly, etc. The operation number is then given, the name of the department and the number of the case. A glance at the ticket at any time gives the condition of the case as regards manufacture and shows the operations which are still necessary to complete the work. The last ticket is removed in the final inspection department, after the crankcase has undergone a detailed and thorough examination.

Car Owner Is Boss of Automobile Industry

A candid critical analysis of the service problems of the industry is contained in the following statements of Norval A. Hawkins. This paper should have the careful attention of every executive in the industry. It is the most important service pronouncement that has yet been presented.

By Norval A. Hawkins*

I THINK we would all do well right at this time to hark back to basic fundamentals, forgetting the frills, red tape and intricacies of our Twentieth Century organizations, and ask ourselves the question, "For whom do we really work?"

It is not the sales manager nor the general manager nor the board of directors nor even the stockholders. The man to whom we really owe our jobs, individually and collectively, figure it any way you like, is none other than Mr. Retail Customer—Mr. Car Owner—the ultimate consumer. It is none other than he who pays us our salaries and tells us whether we shall run full time, double time, half time, or **not at all.**

It is he who is meeting our annual payroll to the tune of one billion forty-two million dollars and it is upon him that we must depend for the future security of our entire industry.

The automobile business must be reduced to sound fundamentals. We are entering into a new era. We've got to forget some of our past tactics. As our Mr. Charles F. Kettering recently expressed it—"the whole scheme of things has been reversed. We are out trying to buy the customer's dollars—our currency is in the form of gears, cylinders, pistons and axles—the exchange must be mutually advantageous—both sides must benefit—honesty must be the basis of all transactions. If the customer tries to pass off a counterfeit dollar on us, we refuse to take it—and by the same token, if we attempt to give him a counterfeit gear, or a defective axle, he has an equal right to become incensed."

In the new scheme of things we must put up a stiff fight for every bit of the business that we get and service to this Mr. Consumer is the cornerstone upon which the future progress of our entire industry will rest.

When such a mechanical product as an automobile is sold, service is a necessary corollary to sales and advertising. One of the fundamental principles of management, therefore, is that service, sales and advertising are essentially interrelated and must be governed by the same general policy if perfect co-ordination is to be effected.

MANY dealers have failed because the men at the factory have guessed at what they needed instead of making it their business to know what they require.

Service should begin with the design of the car and be projected throughout the manufacturing and marketing of the product and stop only when the car is thrown in the discard after its owner has received an adequate return for his investment.

If the service manager does his duty repair work will gravitate to the regular dealers instead of to the back alley garage.

Service is not a matter of minor concern, to be considered after the purchase of a car, as a mere incident. It is of major importance. Properly co-ordinated with selling and advertising, the service policies of any company, when a system of service is made effective, will be the most powerful means of building up its business.

Service is a matter of major importance, deserving of the greatest executive consideration. All of us should be directly concerned with the establishment and use of basic principles of perfect service to every car user, irrespective of the make of car that he drives.

We must be unselfish about this thing. We can best help ourselves by helping one another. No one manufacturer can ever hope to have enough service stations to care for each and every one of his vehicles irrespective of where they may happen to be. The owner, at some time or another, is at the mercy of an independent garage or a dealer who has a competitive interest. It is only through co-operation that we may adequately serve the owner.

Experience has developed all the right principles of service. It remains only for us to put these principles into effect by applying them to our own specific products and co-operating one with another.

There are five causes and **only** five causes of service cost to the producer, or the car owner, or both. They are as follows:

1st—Faulty engineering design.
2nd—Faulty production, including careless workmanship, faulty material, or both.
3rd—Incompetence on part of service repair men.
4th—Incompetence on the part of the user.
5th—The wear and tear of normal use.

The first, second and third causes for service expense are directly within the control of the manufacturer, and we as service managers should make it our business to take some interest in the fifth cause.

Service should properly begin with the design of the car—in fact it should begin with the very conception of a product and it should be projected through the engineering, manufacturing and marketing process, assum-

*Advisory staff of General Motors Corporation. Abstract from a paper presented before N. A. C. C. Service Managers' Convention.

ing an ever increasing importance after the product is in the hands of the user and until the time that it is ready for the discard through legitimate and honest wear **—after having given an adequate return on the customer's investment.**

If the maximum value to the user with the minimum service cost to the manufacturer is to be attained, then the future changes in our products must be in the direction of eliminating needless varieties in design and toward the selection of the best types of construction.

The elimination of needless variety is necessary to reduction of both production costs and service costs for two reasons, to wit:

1st—Quality of workmanship and material are more easily maintained as the variations in mechanical practice are decreased, and

2nd—Because incompetence of the service workman can be more effectively reduced as the variations in mechanical practice decrease.

It necessarily follows that future changes in automotive products should not only lead toward the **elimination** of needless variety, but the maintenance of the **needed** variety and the correct use of these variances with respect to more intelligent marketing policies.

I wonder just how much thought your engineering departments are giving to this question of service. I'll tell you some of the things that we are beginning to do in the General Motors Corporation.

First of all, in the future, no new model will ever get into production until it has been subjected to the most gruelling scientific tests that we are able to devise. I don't refer to block tests and cross country advertising tours either. I mean that a proposed model must be subjected to service equivalent to what it would get from the most careless user during the normal life of the car, keeping an accurate "log" of wear, breakage, etc., in order that we may in our service manuals give the dealer and owner specific, accurate and dependable information regarding the upkeep, repairs and replacements. Also, that we may give the dealer, right from the start, accurate data regarding the replacement parts that he should carry in stock.

And this is not all. Before we go into production on any new model, such a model must be carefully analyzed from a mechanical service standpoint. The design will not stop with the completion of the layouts and detail drawings covering the parts of the car itself, nor even with the design of production tools for its manufacture. Before any such job goes into production in any of our factories in the future, no less than five sets of tools must be designed, as follows:

1st—Jigs and fixtures for factory production.
2nd—Repair tools and fixtures for service shops at branches and large distributors.
3rd—Repair tools and fixtures for large dealers.
4th—Repair tools and fixtures for small dealers and sub-dealers.
5th—Hand tools for the owner designed especially for the particular car and adequate for such minor repairs and adjustments as may be entrusted to him.

In other words, when the owner finds something wrong on his car and he has no tool for repairing it he knows that it is time for him to visit his dealer and when the dealer has a job of overhauling for which his class of equipment is inadequate, he will in turn refer such work to the nearest distributor or branch with whom he will have a standard working arrangement covered by the terms of his contract.

The same plan will apply to service manuals and each of the five groups will be supplied with accurate and specific detailed instructions for doing the work entrusted to it.

The service man is essentially a salesman—in fact he must be a super-salesman. The new car salesman, generally speaking, sells the customer only one time. The service salesman, on the other hand, must keep the man sold by reselling him time and time again throughout the life of the car.

And remember this—the customer is invariably in the best of spirits when he negotiates with the new car salesman, but his transactions with the service salesman are usually under the most exasperating conditions.

The success of a company is primarily dependent upon the adequacy of its sales and service. There must, in the future, be a more equitable working arrangement between these two most important phases of the industry.

The salesman must work in closer co-operation with the service department. When the owner has trouble he calls on the service man to remedy it—**not the salesman.** Therefore, the service department should have something to say regarding the claims and promises of the ultra-enthusiastic salesman.

When a salesman resorts to untruths or to promises which he knows cannot be fulfilled it is an admission that he is lacking in real sales ability.

Motor cars, in the future, are going to be sold from the back door rather than from the sales floors and across mahogany tables. Those of us who expect to survive keen competition in a permanent buyers' market must get our "house in order."

Inasmuch as we started this discussion from the consumer end, let us next consider the dealer and the garageman and in this connection let me say that we must stop trying to "pass the buck" to the retail service organization.

While it is generally conceded that such institutions are not efficiently operated, they are not so much to blame as are we who have failed to educate our retail representatives in the proper methods of doing business.

If the retail service station has been inefficient, it is we who are to blame. There is a total of 45,135 automobile repair shops in the United States. It stands to reason that the individuals operating these repair shops do not have the same opportunities to develop proper methods of servicing our products as do we with our elaborate organizations and service specialists.

We must begin to take greater advantage of our facilities and give our dealers the advantage of our best experience.

Let us remember that while these service and repair stations are for the most part operated by individuals not directly on our factory payrolls, they nevertheless work for the same boss that we do, namely—Mr. Car Owner. These independent garages and service shops are not independent after all—they are absolutely dependent upon our product and upon the good will of the public. Many of them are our own dealers operating under contracts which carry mutual advantages.

The most valuable asset of any automotive manufacturing organization is its territorial market. There is a limit to this territorial market. From a standpoint of area, it cannot be increased. A dealer's contract allows him to work a definite part of this territory.

Service, in terms of our industry, divides itself into three classifications:

1—Parts manufacture and distribution.
2—Mechanical repair work.
3—Moral or psychological service.

In all three classifications, we need greater efficiency. And when I say efficiency, I don't mean "red tape" and system for the sake of system. When you come right down to brass tacks, there is only one definition of this word "efficiency" and it may be expressed in these two words, **"Responsibility Met."** We who have to do with service must meet our responsibility by seeing to it that our dealers carry adequate parts to serve our customers.

We must also develop scientific methods for anticipating repair parts requirements—both between the dealer and the factory service department and between the factory service department and the production department.

Before we can get our dealers to follow our methods, we've got to actually show these dealers how they can make a profit.

The reason that many dealers have failed to make a profit on their parts business is because we fellows back at the factories have **guessed** at what they needed rather than making it our business to **know** what they were going to require. The result has been reflected in great volumes of telegraphic orders, express shipments and unnecessary expense to the car owner.

Within our own organization we found through a careful analysis that from 20 to 35 per cent of all repair parts orders during the first six months of 1921, were telegraphic and that almost 50 per cent of our parts shipments were going forward by express or parcel post as rush orders with a consequent high percentage of errors.

Nor is it sufficient that we merely get them there, we must get them there in a usable condition and see to it that the dealer keeps them in a usable condition.

Before we can instruct the dealer on this, we must begin practising it ourselves. I was in one of our largest factory service departments not long ago and the gaskets for the cylinder heads and crankcases looked as though they had been put in the bins with either a pitchfork or an air conveyor. I was in another plant where we found that the connecting rods after having been aligned and inspected were thrown in a big box with several thousand others, with the natural result that the rods in the bottom of the box were bent out of shape.

In still another factory, delicate electrical parts were being handled and stored as though they were made of pig iron.

Safeguarding the quality and condition of repair parts is of vital importance to our industry. Unnecessary handling is both wasteful and expensive. With the proper development of a unit system, for packing, the repeated handling, counting and checking of repair parts with the damage and waste incident thereto can be eliminated.

Scientific anticipation of repair parts requirements and the distribution of parts on a wholesale basis are necessarily the forerunners of an efficient unit package system and we've all got to come to it.

We have no right to penalize our customers for our own inefficiencies incident to the repeated physical handling of our repair parts. We have not discharged our obligations to the car owner. We have not met our responsibility until we get these parts to him in the right condition and at the right price.

EFFICIENT service is the most effective insurance to take out on the future prosperity of the automotive manufacturer. Service is being weighed in the balance and found wanting. Haphazard methods cannot survive and the manufacturer must teach the dealer how to conduct his service at a profit and at the same time reduce the costs to the car owner. The good will of the latter gentleman will insure profits.

Although the war is over and the price of materials and labor has settled down to a more or less stable level, we are still asking the owner to pay us exorbitant prices for parts necessary to the maintenance of his car.

The completed motor vehicle is designed and built to meet a certain market price, but repair parts for this same vehicle are manufactured on a cost plus basis and any loose ends of operating costs are thrown into the bargain.

We recently made an investigation on a number of cars of representative makes to determine the relation between aggregate repair parts prices and the list prices of the finished products. The ratio ran from one and one-half to two.

Why should it be necessary to get twice as much for a disassembled car as you get for an assembled car? The complete car has a great deal more mechanical labor chargeable to it. There is always an unavoidable breakage of material incidental to the assembly process. It is supposed to require a more expensive type of salesman to sell a finished car and it is usually necessary to demonstrate it before consummating the sale.

And again most of us are still adhering to the unbusinesslike wartime practice of omitting our repair parts prices from our parts catalog.

It surprises me to learn that a number of companies have even discontinued the practice of supplying owners with parts catalogs.

We of the automobile fraternity do not hesitate to spend $7,500 in the big weekly to call our product to the attention of the buyer and if Mr. Buyer answers the ad we send him 18 form letters, six folders, a dollar and a half catalog and a liveried chauffeur to take him for a ride in the park—then after he buys the car we refuse point blank to give him a parts catalog and some of us even go so far as to attempt to charge him for it.

The present day dealer, in striking contrast—submerged in a multiplicity of models conspicuously free from any and all interchangeability of parts—is in the predicament of having entirely too many parts catalogs. He finds it necessary to refer to a veritable "5-ft. shelf" of voluminous literature to ferret out the various serial numbers, parts numbers, pattern numbers, model numbers, car numbers, motor numbers, code designations, historical data references, alphabetical prefixes, differential discounts and war tax schedules, before he becomes a party to the secret of just how much **too much** he is going to have to pay for the blame thing!

And even this isn't the worst of it for the dealer immediately goes us one better and begins to tack on extra charges covering freight, express, telegrams, handling, overhead and **wear and tear on his nervous system.**

I am in favor of lower prices and uniform prices on repair parts, but please don't misunderstand me. I am not at all in sympathy with those of you who do not think that a service department should be conducted for a profit and if you want to earn the status with your respective organizations to which you are entitled, if you want to be looked upon as producers instead of parasites—if you want to be business executives instead of clerks—you've got to look at it just as I do. If you are ambitious for recognition in an executive way, you MUST be able to show your results on the right side of the ledger.

Of course there are two kinds of profits accruing from service: 1st, the direct dollars and cents profit as it appears on the balance sheet; 2nd, the indirect and intangible profit accruing from the good will of a customer properly served, which is in turn reflected in the sale of new cars.

It is my contention that these two profits are entirely compatible in any manufacturing institution which has an economic reason for its existence.

Do you issue regular reports covering such items in order that your organization may get a true reflection as to the quality of the product? Do you know how much such replacements are costing you per automobile?

What is being done about it? Is the cost decreasing or increasing? What department is being charged with these costs?

Unless you are thinking in terms of profits and disseminating data of this kind among the proper departments of your organization, you have not met your responsibility—you are not doing your duty as service managers.

If the production has too much material of a certain kind, they try to pass the buck by turning it over to you service men, whether you need it or not. Let me say right here, that if you thought more about profits and turnovers you would not stand for this sort of thing three seconds!

We have just inaugurated a policy within General Motors, handed down from the president through the executive committee, that provides for service parts requirements being given precedence over production requirements, first, last and always—irrespective of the new car orders on file—and without consideration for any temporary financial loss.

We have arrived at the very sound conclusion that keeping the old cars running is of far greater and more lasting importance than the matter of getting the new cars sold.

The old car owner must be given first consideration if we expect to get new car owners. The repair parts phase of the industry must be conducted for profits but these profits must come through greater efficiencies all along the line rather than by the maintenance of prohibitive repair parts prices.

* * *

Efficient mechanical service on the part of the dealer is of prime importance. It is not enough that he be able to just "fix" a car so that it will run—he should possess the knowledge and facilities for turning out work that would pass the most rigid factory inspection. He should have equipment proportionate to his service requirements. He should have special tools for those operations peculiar to the **particular** car that he represents, unless he is a very small dealer, in which case he should have a working arrangement with his distributer on overhaul jobs which he is not prepared to handle.

Here again the responsibility rests with the manufacturer.

It is the business of the factory service manager to develop or to **have** developed special tools and service fixtures for the use of the dealer and distributer and to see to it that such equipment is properly used.

The dealer must be shown how to lay out his shop properly. The stationary equipment should be located with a view to increased efficiency and the hand tools should be kept in special tool racks where they may be readily located instead of thrown helter-skelter around the shop. The owner must not be penalized for inexcusable lack of efficiency.

If the service manager does his duty in this direction, repair work will gravitate to our regular dealers instead of to the back alley garage.

It is my prediction that within three years every reputable repair shop in America will be operating on some form of flat rate system. Whether we like it or not, we've got to come to it and when we **do** come to it we'll be surprised at just how low our past efficiency has been.

* * *

In our **factories** we know just how long it takes to do a specific operation, and the exact cost of the material and labor involved, whereas, on the other hand, our service stations refuse point blank to tell a man what a repair job is going to cost him; as a matter of fact, they seldom charge any two people the same amount for doing the same job.

To me the necessity for standardizing repair operations is so obvious and so simple of accomplishment that it makes me mad when I hear a service manager say that it is impractical in connection with his particular product.

I'd like someone here to tell me the difference between putting on a steering knuckle in a factory and in a service station in so far as the problem of cost analysis is concerned.

And next we come to our third classification of service, namely, **moral or psychological service.**

In the future, we are going to see this thing that I choose to call moral service assume an ever increasing importance.

It will project itself through every phase of our service activity. Our boss, the car owner, is already demanding it, he has been meek and long suffering but his patience is just about exhausted.

Take the matter of keeping cars clean in a repair shop. A man may bring his car into your service station ever so dirty but this does not license you to turn it back to him in a still more untidy condition.

If I sent a coat to a tailor shop to have a button put on or a rip sewed up and the tailor spilled a can of machine oil on it or let his dog use it for a bed I would raise the dickens and so would you and yet every day cars are being turned out of our "authorized service" stations so greasy and mussy that after you've ridden around the next block you're a fit candidate for a Turkish bath.

Even our finest closed jobs are not immune—in fact, the average mechanic seems to fairly revel in the joys of disseminating grease and oil on a broadcloth interior —he may miss the universal joints, the transmission and the differential but the front cushion and the steering wheel—**N-E-V-E-R!**

Sales psychology must be projected into service.

To be successful, a service station must be conducted with a proper observance of the fundamental rules of psychology, common sense and decent business practices.

A strict observance of office hours should be taboo in any automobile repair shop. The biggest volume of sales on minor repair parts and accessories is made and the greatest good will is built between 5.00 p. m. and 9.00 a. m., during the noon hour and on holidays.

I would also suggest that you check up the service departments of your own immediate organizations and when I say Service Departments, I mean far more than the routine activity between the four walls enclosing the employees for whom you are directly responsible.

You must consider every phase of activity connected with your institution before you can get a true perspective of the service end of your business.

The service manager should spend more time out in the territory studying the problems of the dealers and

assisting them in the development of more efficient and uniform methods.

Service is being weighed in the balance and it is found wanting. Haphazard methods cannot survive. Service will be reduced to a uniform science. We must teach the dealer how to conduct his service at a profit and at the same time reduce the costs to the car owner.

After we have developed the proper methods, it will then be our business to check up our dealers in order that the good will of the car owner and hence the future profits of the industry may be insured.

Generally speaking, service in the automotive industry has been handled in a careless and inefficient manner. In the majority of cases it has been looked upon as a necessary evil—a side issue, subordinate to the major activity of building and selling complete units. It has been developed—or rather it has **"grown up"** in a hit-and-miss sort of fashion and has never had a share of recognition and sympathy proportionate to its importance. Most of us have depended too much on the sales of **new** cars to **new** customers, through **new** and spectacular advertising schemes, with ever changing models marketed through a **new** crop of dealers each season.

As a product attains a wide distribution the prospective purchaser becomes more or less immune to our advertising and sales activity and more and more under the influence of his friends who have had experience with the product in question. Whether the product receives an endorsement or condemnation depends largely upon the efficiency of the service that has been and is being rendered.

Efficient service is the most effective insurance to take out on the future prosperity of the automotive manufacturer.

We must sell service first and motor vehicles second. No matter how perfect the design and workmanship of so intricate a product as a motor vehicle, it cannot and will not stand up and give a satisfactory account of itself unless it is kept in first class condition through systematic inspection, adjustment and parts replacements. And by the same token, even a second rate vehicle can be kept going beyond its normal life if it is properly serviced.

The automotive industry leads all others in the fields of scientific research, invention, engineering, processing and manufacturing. The efficiencies and economies exercised in our modern plants are the standards of the world, but the injection of similar standards and efficiencies into our marketing and servicing methods is yet to be accomplished—and remember that **"He profits most who serves best."**

Electric Cars in Bulgaria

POSSIBILITIES for the use of electric cars in the Balkan States are outlined in a communication recently received by AUTOMOTIVE INDUSTRIES from a correspondent in Bulgaria. He states that the present high price of gasoline, combined with various other conditions, makes the electric passenger car or truck practical in those countries, and believes a good market could be found for them there.

The gasoline car is being used considerably in the Balkan States, but thus far no possibility of using the electric has been mentioned there. There are certain conditions which do not speak well for the use of electrics, such as indifferent roads and the lack of electrical plants equipped for recharging the batteries of cars. Despite these drawbacks, the correspondent is convinced that the electric car would prove successful.

Gasoline has increased in price since the war until it is almost beyond the reach of the average purchaser, while the price of electric energy has risen but 50 per cent. The difference in prices is due to the fact that gasoline is imported and the price depends largely upon the rate of exchange. Electric power is supplied by plants having water power turbines or else generating their power with Bulgarian coal. The lack of technical education among drivers might also tend to make operation of the electric cars somewhat easier. The water power resources in Bulgaria are extensive, and the required current for operating electrics could be supplied readily, for in many spots electric plants have sprung up, and but a slight adjustment of their equipment would be necessary to equip them with charging apparatus.

A regular electric transport service might possibly be developed in Bulgaria in the districts where water power is most plentiful. It is interesting to note that a good many Bulgarian forest projects, mining ventures and other undertakings cannot be developed until the transportation question is satisfactorily solved. Motor trucks have thus far proved unsatisfactory in solving this problem on account of the high price of gasoline.

The electric taxicab and bus is also mentioned as a possibility in Bulgarian cities.

The greatest obstacle, apparently, is the roughness of the roads, and electric cars for use in the Balkans would of necessity be compelled to have their batteries shockproof as far as possible.

Several Changes Made in Cole Eight

(*Continued from page* 1004)

assembly is now mounted on a coil spring suspension to relieve the core of all strains and eliminate squeaks and rattles.

An adjustable tie-bar is now used between the radiator assembly and the dash of the body to keep these parts in line. This tie is an addition to the support formed by the center panel of the hood, which is bolted to the radiator shell and the body dash. The hood itself has been materially improved in that heavier gaged stock is now used and reinforcements have been made in the hinge construction. The hood fasteners are now adjustable as far as the spring tension is concerned.

The rear spare tire carrier has been provided with a bottom brace to add to its rigidity, and the windshield assembly on the open model now has stanchions supported in a bracket having a firm footing in the body structure. All of these changes increase the rigidity of the assembly and help do away with rattles.

BECAUSE gasoline is very dear in France, trolley-buses are taking the place of the vehicles at present in use. Reductions in fares will immediately follow this economy.

Problems Frankly Analyzed at Service Managers Convention

Factory service managers believe that parts prices must be reduced, that methods of handling and ordering parts should be more efficient, and that the service manager should be consulted more fully in regard to car design. General sentiment seemed favorable to adoption of the flat rate system.

MR. Car Owner is the boss of every man in the automobile business. This thought, voiced by Norval A. Hawkins in the opening address, dominated the entire convention of N. A. C. C. Service Managers which took place in New York on Nov. 15 and 16. Both the scheduled speakers and those who discussed the various problems brought up agreed that the success of a service policy is determined in the final analysis by whether or not it satisfies the car owner.

Many practical service problems were frankly discussed and the fundamentals underlying proper service were outlined. It was the general sentiment that parts prices should and must come down. A majority of those present agreed that price reductions in cars have not been reflected sufficiently in parts prices. One speaker stated that an analysis of a number of makes of cars showed that the total selling price of all the parts of the car as compared with the price of the assembled vehicle ranged from 1½ to 2 times as great. Others voiced the opinion privately that these figures were very conservative. Certain causes for this discrepancy in price were advanced, but the sentiment prevailed that no just cause existed for the extreme difference noticed in most cases.

The importance of service as a factor in selling was strongly emphasized. It was pointed out that service is now a matter of major importance, and Hawkins even went so far as to state that it is more important to keep the old cars running than to build new cars. He stated that "we have inaugurated a policy within General Motors, handed down from the president through the executive committee, that provides for service parts requirements being given precedence over production requirements, first, last and always—irrespective of the new car orders on file—and without consideration for any temporary financial loss."

Educating the Dealer

The need for education of the dealer played a prominent part in the discussions. The manufacturer must take the lead in starting progressive service methods and plans and in aiding the dealer to carry them out, according to Percy E. Chamberlain, who gave the principal address at the second day's session. Chamberlain discussed the problems of the dealer in connection with service and made a strong plea for the flat rate system of making service charges. In discussing the necessity for the manufacturer taking the lead in dealer education, he said that such leadership could not be accomplished by "jazz" methods. It is essential that the traveling man sent out by the manufacturer be a real business man with a thorough knowledge of the fundamentals upon which service problems rest.

The danger of being hampered by tradition was strongly presented by Chamberlain. "Many of our service problems are simply practice," he said, and pointed out the way in which progressive methods were often difficult to establish simply because the habit of the past had been to "do it a certain way."

"We are through with the war—between service stations and car owners—and the industry wants to know what the peace terms are." With this statement as a basis, Chamberlain discussed the interest which he found throughout the country in service problems and indicated that a real movement was on foot to analyze these problems carefully and to solve them along fundamentally sound lines.

Service in Design

The engineering department came in for discussion. One speaker started the ball rolling by saying that "one thing that will help service problems, the used car problem, the public, the manufacturer and the dealer is to start building automobiles a darn sight better—and to begin to pay more attention to service problems when the car is being designed."

Many of the service managers cited instances in which the engineering department failed to consider service problems sufficiently. Some believed that the engineer often tends to be temperamental about his design; to consider only theory and laboratory results even in the face of practical difficulties developed in the average car on the road.

It was generally agreed that the service department should be consulted more fully in the matter of design and that the engineering department should utilize to better advantage the experience of the service manager.

Along this line the matter of constantly changing models was discussed. The great service difficulties involved in frequent changes were pointed out, and the service managers seemed to believe that manufacturers should consider this point more than in the past when discussing new models.

The discussion on "What can be done to reduce the cost of parts to the owner?" failed to develop the constructive plans that might have been desired. Many reasons for high prices were given and the responsibility for their continuance was placed in many quarters. As regards a real remedy for the situation, however, it cannot be said that a great deal of new data was developed. Possibilities for increased efficiency in the ordering and handling of parts were pointed out, however, and the necessity for eliminating from service department charges certain extraneous items was indicated.

The flat rate system was discussed at length following

Chamberlain's talk. The general opinion of the meeting was favorable to its adoption, although certain difficulties in its use were pointed out in special cases. Those who have had experience with it, however, were strongly convinced of its benefits, with one exception. These benefits extended, not only to the car owner, but to the dealer and manufacturer as well.

The part of the manufacturer in the establishment and development of the flat rate system brought out several practical suggestions. It was agreed that the manufacturer can do a great deal to help the dealer in analyzing his costs, both labor, material and overhead.

The necessity for finishing efforts begun along this line was long emphasized. There was some fear expressed that manufacturers might start detailed dealer education plans of this kind, send out one or two booklets, and let it go at that.

Taken as a whole, the meeting developed a great deal of interesting discussion. While conclusions were not reached definitely in regard to any of the questions presented, certain well-defined trends appeared as indicated previously. The sentiments expressed served to visualize definitely the constantly growing importance of service in the scheme of automobile marketing and to bring into relief some of the chief problems common to all companies, together with constructive thoughts as regards their solution.

Norval A. Hawkins of the Advisory Staff of the General Motors Corporation, in his address, "For Whom Do You Work?" outlined the present status, past and present difficulties, the factors involved, and methods of possible solution in regard to almost every phase of the service problem. Speaking candidly and frankly, he discussed the causes of service, the factors involved and the responsibility of the manufacturer in regard to each of those factors. He came out definitely in favor of the flat rate system, stating that "it is my prediction that within three years every reputable repair shop in America will be operating on some form of flat rate system."

The entire address was distinctly refreshing in its frankness, vigor and scope. It is reprinted on other pages of this issue.

East Africa as a Market for Motor Vehicles

A REPORT, written by Colonel Franklin, Trade Commissioner, has been published by the British Department of Overseas Trade on the trade and commercial prospects of East Africa. This area comprises Uganda, Kenya, Tanganyika, Zanzibar and Pemba, totaling 751,600 square miles, and is larger than the States of Texas, California, Montana, New Mexico, and Illinois put together. The whole area is one of great potentialities. Its mineral wealth is great, and its fertile, terraced lands permit most tropical and temperate products to grow profusely. It is lack of transport facilities that prevents their exploitation.

East Africa claims the highest proportion of motors per white population in the world. At the same time, Kenya and Tanganyika are practically destitute of good roads. Pemba, a huge clove plantation, is to be provided with roads, and this year $400,000 will be put to this purpose. Uganda's roads, however, are good. It has 600 miles of all-weather motor roads, while a further 800 are passable for trucks in the dry season. Settlers in Uganda fully appreciate the advantages of good roads. Three-tonners are considered the most serviceable type here, but Ford and Chevrolet 1-ton trucks are very popular throughout the entire district.

This market has been quiet since the war, chiefly because the cessation of hostilities against German East Africa left a large number of surplus vehicles in the area. These, however, have now been absorbed, and the demand is steadily increasing. During the last quarter of 1920, for instance, Kenya alone took $400,000 of motor vehicles, mostly from the United States. Utility is considered before appearance, and rough going makes high clearance essential. There should never be a dearth of good drivers in East Africa as the natives show a natural aptitude for managing motor vehicles. This is an important factor as the climate, though generally healthy, is not fitted for manual labor by whites.

Gasoline is expensive in East Africa. A 20 per cent import tax is made on it, and when in the country the effects of altitude cause a wastage of 25 per cent. Oil has been found in Uganda, but whether it will prove a paying proposition has not yet been ascertained. A factory has been erected near Nairobi for the production of natalite, considered the future automotive fuel for East Africa. Much depends, however, on whether enough sugar will be grown locally for its production.

With transportation vital to East Africa's development, and with the authorities striving to improve communications and find settlers, manufacturers would be well advised to establish agencies at Kilindini, Nairobi, Kampala, Tanga, Dares-Salaam, or Zanzibar. During the last decade America has practically monopolized automotive demands in East Africa, but an effort must be made if this position is to be maintained.

Canadian Farmers and Automobiles

CANADIAN registration figures published recently show that the farmers of Ontario own 36.8 per cent of all the automobiles in that province. And near Winnipeg there has been found a grain farm of 12,000 acres upon which not a single horse is used, nor a single head of livestock raised. All the work is done with trucks and tractors. It was figured that 400 horses would be necessary to do all the work on the farm, and grain from 2000 acres would be required to feed them.

The total number of cars owned by the Ontario farmers is something like 75,000. The tradesmen own 11.7 per cent of the cars in the province and business men 10.8 per cent. The balance is scattered among people in various walks of life.

The light car is still the most popular in Canada. The touring car is the model preferred by 89.1 per cent of passenger car owners, the roadster by 6.7 per cent, sedans 2.2 per cent and coupés 1.8 per cent. Taxis and buses number about .2 per cent of the total.

THE following statement from the J. I. Case Threshing Machine Co. refers to the article published in AUTOMOTIVE INDUSTRIES of Oct. 27 concerning the recent British tractor tests:

"We note that on tractor No. 10, 46 horsepower Case, no belt tests are given because the tractor did not line up in the time allowed. This statement is misleading because it would appear that the engine could not be lined up to the brake within the time allowed. Our representative reports to us that there was no difficulty in lining up with the brake but that the brake was of too small capacity to measure the power which can be developed by this tractor."

Marketing the Motorcycle

Part I

Besides asking "Where is the motorcycle going?" it is pertinent to inquire "How is it going to get there?" This article and the one following attempt to outline the factors underlying an answer to this second question. The principles involved in determining the extent of the market are discussed.

By Norman G. Shidle

A FRANK consideration of fundamental factors is always essential to the building of permanent progress. In planning commercial growth, it is more important to discover true basic facts than to successfully defend unsound methods and practices. An analysis of such facts may show serious defects in an industry, but in doing so provide accurate data upon which to base plans for a successful future. Tradition is a strong master and sometimes a hard one. The overthrow of tradition does not necessarily mean progress, but it often does. Tradition, the lesson of the past, is valuable in planning future progress in so far as it is regarded as one of the factors to be considered in a broad analysis; it is detrimental, in so far as it tries to force all other facts and conditions to conform to its standards.

Merchandising the motorcycle constitutes, perhaps, the most intricate and complex commercial problem in the automotive industry. The automobile and the truck will have far to go as regards marketing methods, but their field is comparatively well defined and the general type of vehicle has been determined. Analysis of statistics and other data shows, moreover, a healthy and comparatively permanent growth in these lines. This is not true of the motorcycle. The apparent failure of the motorcycle industry to record normal progress during recent years was discussed in a series of articles in AUTOMOTIVE INDUSTRIES some months ago. The factors developed in these previous discussions have a direct bearing on the vital merchandising problems which confront the motorcycle industry at the present time. A survey of the motorcycle situation at this time brings to light this fact:

Upon the ability of the manufacturers and dealers to develop and operate an effective merchandising policy rests the future of the industry. The sales department and the work of sales research will be most important factors in answering the question "Where is the motorcycle going?" The time for "abiding faith" and general ideas as regards the field for the motorcycle appears to have passed. The accumulation of accurate facts and data and a thorough analysis and interpretation of such facts is the immediate task of the industry.

"THERE is a big future for the motorcycle in the United States; there is a large potential market that has not yet been sold," said one prominent manufacturer.

"The field of the motorcycle is extremely limited; I see but little opportunity for it to develop in this country," said another.

The substitution of careful marketing research for general opinions based on general ideas and experience is one of the chief immediate needs of the motorcycle industry.

The problem divides logically into two parts which may be summarized briefly as follows:

1. To analyze the field so that a given territory, and finally the sum of all territories, can be appraised with something like accuracy; to determine as nearly as possible the potential field and the people comprising that field.

2. The development of a merchandising plan based upon the results of this analysis; a merchandising plan which will be progressive and comprehensive in a way which would be impossible without the analysis to define the field and point to the goal; a plan specially adapted to the type of machine manufactured.

The second of these phases has been frequently discussed, but there is still much to be said and much to be learned. Any discussion of the second phase, however, can be of only limited value unless it is based upon a rather thorough investigation of the first phase. Unless there is something like accurate knowledge as to markets—and there is no such knowledge at present—a discussion of actual merchandising methods can have only a general and somewhat aimless direction. There are certain selling methods, of course, that would obviously be of equal advantage under any circumstances, but efficient selling must rest upon a thorough knowledge of who and what comprise the market.

If a large percentage of the potential motorcycle market, for instance, is comprised of those strongly interested in racing, the expenditure of a large proportion of the merchandising appropriation for racing purposes would be justified. So with the planning and operating of all other marketing plans. To direct and apportion them intelligently, something like accurate data is needed upon which to work. Such data can be obtained only by hard work, careful study, long periods of investigation and considerable experimentation.

It is always impossible, of course, to estimate a market exactly, because the appearance of a new product often creates new prospects in itself. The Ford automatically made prospects of many people who never before considered themselves automobile prospects. Consequently, any sort of estimate attempted must be empirical in nature. It is, however, none the less valuable as a basis for plans and operations.

Various men in the motorcycle industry have their own opinions as to where the motorcycle market lies, how broad is its extent, and what are the limits of its development. But little work has actually been done to collect statistics or develop fact-data upon which to base a sound decision. The very fact that several men, all of them long associated with the industry, have widely varying opinions on this point indicates the lack of real research and the absence of comprehensive data.

In attempting to analyze the motorcycle field in this way, the possible market may be divided for general purposes into three classes:

1. Those who are already motorcycle prospects; who ride or would like to ride a motorcycle as it is now built and merchandised, and ridden. How many and what type of machines do these prospects want?
2. Those who could advantageously use a motorcycle; whose life would be more pleasant and more efficient if they owned a motorcycle, but who at the present time have no desire for a motorcycle. How many and what type of machine can be sold to this class?
3. Those who, for various reasons, are not and never will be prospects for a motorcycle.

To have the data on these three points would make it possible to determine with some degree of accuracy what is the actual field of the motorcycle in the United States, what demand can be expected, what room there is for development, and in what parts of the field development is lacking. Briefly, it would permit the making of intelligent sales and production plans.

What are the factors to be considered in such an analysis and how can the analysis be made? In AUTOMOTIVE INDUSTRIES of July 7, this same problem was discussed as regards passenger cars. A part of that discussion will apply as well to motorcycles, but much of it will not. Nevertheless, an examination of that article will be of value in connection with the present discussion. Determination of motorcycle markets rests upon different bases than the making of similar studies for passenger cars. Certain variables appear in a motorcycle analysis not encountered in the former case.

A certain part of the potential motorcycle market, for instance, is continually changing, namely the young men who ride the machines simply for sport purposes; the class who ride for the thrills and the pleasure; with whom the motorcycle is a hobby—and like most hobbies a temporary proposition.

There is one chief difference between the market analysis for automobiles or for any given automobile and that for motorcycles. Almost every man or family with sufficient income is a prospect for an automobile. The size of his income is usually the determining factor in deciding the class of automobile for which he is a prospect. In other words, the financial status of a man largely is responsible for whether or not he is a prospect for some kind of automobile in the United States. This is not true as regards motorcycles.

While a man must have a certain amount of money to buy and operate a motorcycle, it cannot be said that all those above that given amount are motorcycle prospects. Moreover, even if the financial upper and lower limits were determined for motorcycle ownership, it does not follow that the man with the larger income would necessarily be a prospect for the larger rather than the less expensive motorcycle. This is true because the factors of age, strength, safety and operating ability enter to so large an extent—all of which are almost entirely absent in making an automobile analysis.

A proper estimate of the motorcycle market cannot be made, however, without considering automobile statistics, even though sales work in the moforcycle field be based upon an entirely different approach and entirely different factors. The variable factors make territorial analysis for motorcycle sales extremely difficult, but none the less necessary to intelligent sales effort. Because of the great difficulty, however, it is probably best to begin with a small territory, since the analysis must be intensive and as accurate as possible if it is to be of value.

The results of intensive analysis of a given territory will not aid in planning production, of course, except in so far as the given territory is typical of the country. It will give facts as regards that territory, however, which will enable the manufacturer to determine just how many motorcycles of each type may be absorbed in that territory, how many prospects there are in each of the various classes and how well the dealer is cultivating his territory. Moreover, if the territory analyzed is typical of other similar territories, the results obtained will be of wider value immediately.

Gradually, of course, the entire country must be so analyzed, the results of all the territories correlated, and production and sales plans based upon the results so obtained. Intensive study in a given territory, however, would allow the working out of all the factors involved and their proper correlation. Enough benefit could be derived to pay for the effort expended and the results would aid in determining standards on the basis of which the sales studies could be extended as indicated.

THIS approach to the motorcycle merchandising problem has been made without reference to the methods previously used. This article and the one following comprise an attempt to evaluate each of the factors involved in accordance with their relation to the principles of sound merchandising analysis.

The disproportionate importance assumed by certain factors, such as racing, has been disregarded. A definite attempt has been made to view the entire problem in perspective.

In an attempt to bring this discussion into the realms of practical selling interest and to indicate in a more specific way the lines along which such analysis may be worked out, we may take up a particular case. It may be frankly stated at once that many defects may be found in the figures and the proportions contained in the following attempt at analysis. No extensive research or field work has been done to make the actual figures correct. Even the reasoning may be defective at certain points.

Nevertheless, the effort may achieve its purpose of showing the principles upon which such analysis may be based and of indicating in a general way the lines along which such analysis may be carried out. A following article will discuss the second phase of the merchandising problem indicated previously, on the basis of some of the more recent developments in the motorcycle industry. With these facts in mind we may proceed to the test case. An actual state territory may be taken as an example to illustrate the principle more clearly.

Among the important factors to be considered in selling or analyzing a motorcycle territory are:

1. Population.
   a. Males between 15 and 21.
   b. Working and factory population.
   c. Merchant and professional population.
   d. Office workers, male.
   e. Number of merchants having a light delivery problem.
2. Motorcycle registration.
3. Number of Blank motorcycles already in territory.
4. Number of each of competitive makes in territory.
5. Automobile registration.
6. State police functions for which motorcycle might be used.
7. City police functions.
   a. Speed violation squad.
   b. Park patrols, etc.
8. Local traffic conditions (as detailed an analysis as can be made).
9. Local business.
10. Economic conditions.
    a. Local.
    b. Individual.
11. Human and psychological factors.
12. Garage and parking facilities.

The population of the given territory is 223,003. Counting 4.5 persons as the average family, there are in this territory 49,556 adult males. We may presume, for statistical purposes, that automobiles are owned only by adult males.

Registration statistics show us that there are about 15,000 passenger cars owned in the territory. It is logical to assume that none of these car owners are motorcycle prospects. Thus the total of 49,556 adult males is reduced to 34,556. The present motorcycle registration in this territory is about 500.

Census statistics show that in this territory there were approximately 24,744 male wage earners during 1919 in factories employing 100 or more men and women, while there were in these manufacturing establishments 3076 executives and office workers. The total of these two is 27,820 male workers in manufacturing industries.

Assuming 34,556 male wage earners in the entire territory, this leaves 6736 male workers as merchants, professional, and business men not directly connected with manufacturing plants. The number of boys between 15 and 20 might be estimated on this basis at about 12,000. This is a very rough estimate, but will serve for the sake of this example. Some boys of this age will be prohibited from operating a motor vehicle in certain states. This factor must be considered. Moreover, many boys between the ages of 15 and 20 will be included among factory workers. This 12,000 may be assumed to include only those boys between 15 and 20 who are not factory workers. (Final census figures, of course, will give such data as this accurately, such estimates as these being unnecessary.)

So far our figures line up as follows:

Total male wage earners (automobile owners excluded)	34,556
Factory workers	24,744
Factory office employees	3,076
Merchants, professional men, etc.	6,736
Motorcycle registration	500
Automobile registration	15,000
Boys	12,000

Next it should be possible to determine the present distribution of motorcycles according to the various classifications involved. This information is probably not available at the present time, but data of this kind should be built up by the various factories and later pooled for the benefit of all. For the sake of the example, however, let us suppose the distribution of the 500 now in use is as follows:

Factory wage earners	350
Boys	100
Merchants, etc.	25
Factory office employees	25
	500

Suppose the Ford to comprise 50 per cent of the total registration. This would give a total Ford registration of 7500. Adding to this the approximate number of other low-priced cars, the total would probably reach something like 10,000. (It should be remembered that such information as this is accurately available from registration records or from companies established to render just such service.)

This would leave a total of something like 5000 middle and high-priced cars. It may be assumed that these 5000 middle and high-priced cars and about 1500 Fords and low-priced cars are owned for the most part by 9812 persons comprised in the factory office employees and the merchant and professional class. This leaves 3312 persons in this class who are not car owners, but many of whom would be financially able to own and operate a motorcycle. We may subtract the 50 already owning machines and about 1000 for factory office clerks also unable to buy and operate a motorcycle, leaving 2262.

The remaining 8500 Fords and other low-priced cars, we may assume are operated chiefly by those classed as factory workers. This assumption is not accurate, of course, but may serve our present purpose. This would leave 16,149 men in this class who are not car owners. Not all of these, however, are motorcycle prospects from the financial point of view.

To determine how many of them are is an extremely difficult problem. Here enters the question of what kind of motorcycle the Blank is, how much it costs to own and operate this particular type of machine. This particular factor will require more careful analysis before it can be considered as anything like accurate.

For the purposes of this example, we may estimate that only 50 per cent of this group is financially able to buy a motorcycle. This percentage probably gives the benefit of the doubt to the motorcycle. Thus there would be about 8072 factory workers financially able to buy a motorcycle. Subtracting the 350 already owning machines, leaves 7722.

Now to consider the boys between the ages of 15 and 21, who may legitimately be considered motorcycle prospects. The workingman's son can hardly be considered financially a motorcycle prospect, since the motorcycle is too expensive a form of sport for the workingman to indulge his son in. Thus we may assume that the boy prospects come chiefly from fairly well-to-do families numbered among the factory office employees, and the merchant and professional classes. Since these classes are but 40 per cent of the factory worker group, the estimated 12,000 boy prospects may be immediately cut to 4800.

The factory office employees not numbered among executives and salaried officials are in no better position to give their sons a motorcycle than is the factory workman. On this score some 2000 more can be taken from this list, since the census statistics say there are 1388 clerks and other subordinate salaried employees in the various factories of this territory. That leaves the number of boys whose fathers are financially able to buy them a motorcycle for pleasure use at about 2500. Subtracting the 100 already owning machines leaves 2400.

There is not space here to discuss in detail the analysis of the police and municipal market for motorcycles, a distinct merchandising problem in itself. This field can, however, be analyzed and the potential market de-

termined. Let us say in this case that there is found to be a market for 150 machines.

Those having hunting and fishing licenses, etc., will already have been included in one of the classes discussed.

Thus far we have done two things:

1. We have eliminated all those who for one reason or another are not to be considered as motorcycle prospects in any sense.

2. We have determined the total of those remaining after these eliminations, who are financially in such a position as to be motorcycle prospects.

And in the case given, assuming the figures to be accurate—which in several instances they obviously are not—we have the following:

Factory wage earners	7,722
Merchants, professional men and factory office employees	2,262
Boys (15 to 20)	2,400
Police, etc.	150
Total	12,534

Thus it would appear that there are 12,534 persons in this territory who do not own motorcycles, who are financially able to own and operate a motorcycle, and who are not disqualified as motorcycle prospects by reason of automobile ownership. This group of 12,534 comprises the potential motorcycle field in this given territory. It is to this group that the motorcycle may be sold.

There are, of course, numerous factors that operate to hinder the selling of this potential market 100 per cent. To sell all of them could hardly be expected even under the best conditions.

Certain factors of error are apparent, of course, immediately upon a careful examination of the foregoing analysis, while certain other factors have not been considered because the necessary data was not at hand. Such points as the following fall into that class:

1. The number of merchants having light delivery problems.
2. The number of boys between 16 and 21 included in the number of factory employees.
3. The attributing of the entire Ford ownership to factory employees.
4. The analysis of the police force market.
5. Human and psychological factors; these are fully discussed in the following article.
6. Local conditions of business; traffic.
7. Economic condition of the individual worker.

These and other factors have not been handled with the accuracy and thoroughness essential. Data must be developed for some of them, as it is not available at present in the form adapted to an analysis that is to form the basis of actual plans. The example may serve, however, to indicate the lines along which such analyses can be made. There is nothing specially novel in the methods outlined, but they have not been intensively applied to motorcycle merchandising.

Having collected such data, the next step is to use it properly. It is a waste of time to collect statistics as a matter of interest. The intelligent utilization of this data comprises a major part of the second phase of the entire merchandising problem defined near the beginning of this article. This second phase is discussed in a following article, which will appear in AUTOMOTIVE INDUSTRIES in the near future.

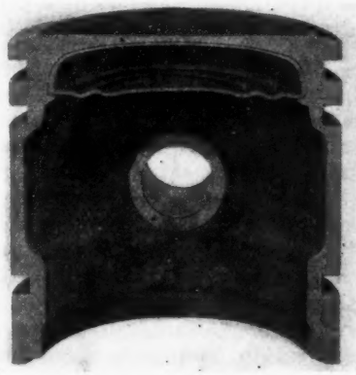
A "Vacuum Piston" to Prevent Burning Crankcase Oil

A NOVEL design of internal combustion engine piston, embodying features intended primarily to prevent the burning of the crankcase oil as it comes in contact with the lower side of the piston head, is being exploited by Hold-Mar Vacuum Piston, Reg. A pressed-steel, air-tight chamber from which some of the air has been exhausted is chill-cast into the upper part of the piston directly underneath the head. After the air chamber is in place in the piston a small hole is punched through the center of the lower face, some of the air is then forced out from the chamber by heating, and the punch hole is sealed up by soldering. In this manner a vacuum of about 8 in. mercury is obtained in the chamber, we are informed.

It is claimed that the use of this "vacuum" chamber prevents the "coking" of the oil on the piston and that no gritty matter can be found in the crankcase oil of an engine equipped with these pistons after it has been in service for a long time. The crankcase oil, it is claimed, remains at a lower temperature than in an engine with ordinary pistons, which seems quite logical.

We understand that several sets of these pistons are at present undergoing tests by the experimental departments of leading companies, and the outcome of these tests will be awaited with interest. Engineers will be especially curious regarding the effect of the vacuum chamber on the tendency of an engine to knock. It is evident that with a heat insulating chamber below the piston head the latter will reach a higher temperature than if it was subject to the cooling action of the oil spray, and with a higher piston head temperature it would seem that the formation of carbon deposits on the upper side of the piston head would be promoted.

Another point to be considered is that the deterioration of crankcase lubricating oil is due to two causes, viz., dilution by the unburnt heavy ends of the fuel and the formation of solid carbon particles, which latter are apt to get into the bearings and wear them out.



Section of Hold-Mar vacuum piston

The question then arises whether the oil becomes unfit for lubrication first through dilution or through contamination with burnt oil. It is, of course, not impossible that the heat insulating qualities of the "vacuum" piston have some effect on the rapidity of dilution, though it is obvious that they cannot entirely prevent it.

Increased Efficiency Through a Decentralization Process

Executives of dominating establishments in several lines of industry have admitted that they cannot compete with concerns of medium size in the same line. Mr. Tipper, in this article, shows that it is impossible to get the same returns from a group of vast size as from the medium sized unit.

By Harry Tipper

DISCUSSIONS have been occurring for some time among business men of economic training concerning the group limitations in size and number of units necessary in order to secure the maximum of efficiency in the individual of the group.

It is important for the manufacturer to remember that no single element of the mechanical fabric of industry has justified by the past development, the tendency to increase the industrial group, because the past development has been almost entirely the building of the fabric and not the operation after it is fairly complete.

This mechanical system of industry has been building from the beginning of the nineteenth century until the World War. In the building of this fabric some groups have been enlarged by the natural centralizing of control and other groups have been separated by the natural decentralization process.

Human variation makes it impossible to secure the same maximum efficiency out of the individual with a group of 25,000 people working in one establishment as with a group of 500 working together. There is a law of diminishing returns in efficiency, in the human skill and activity itself, and this law makes it difficult to secure the same amount of co-operation, intelligent effort and relative co-ordinated skill in the large group.

It is interesting to note that in some important lines of industry to-day the largest operators in those industries are unable to manufacture and sell a given quality and quantity of material at a price at which smaller units in the same field are able to deliver.

Because the introduction of machinery and its increased use demanded the co-operation of larger groups of individuals in the same establishment, we have been led into the assumption that the larger the group, the greater the efficiency. In making this assumption, however, we forget that the new discoveries in productive appliances of a mechanical kind automatically increased the productivity of the individual without reference to his increased capacity.

As the improvement in mechanics slows up and the industrial fabric becomes integrated into a thorough skeleton of organization from a mechanical standpoint, the increase or decrease in the human efficiency becomes more important in its effect upon the economic position of the group.

In fact, this increase or decrease may make the difference in competitive strength in the near future because of its influence upon the cost. Signs are not wanting that there is a definite economic limit beyond which it is unwise to centralize organization, and at which point it is necessary to begin the consideration of decentralization.

The elements of understanding, the freedom of action, the spirit of co-operation become more difficult to insure as the group becomes larger, the centralized system more complicated, and the motions require references to a larger number of supervisors in order to secure a decision. The rules and regulations become paramount when the centralized system governs so large a field and operates through many hundreds of supervisors and many thousands of subordinates. This danger increases much more rapidly as the organization grows from medium to great size than it does when the organization develops from small to medium size. The tendency for rules to grow more rapidly than the requirements of business is much more marked in the management of the larger groups.

In one of the important industries connected with the automotive field where a few of the larger companies represent groups five or eight times the size of any of the others, the amount of business they are securing from the field represents a very much smaller proportion of the total business than their percentage of investment would demand. They are unable to meet the stress of competition as successfully as the medium size concern, because of the many factors involved, the complicated system of operation demanded and the neutralization of their buying and capital advantages by the inefficiences, lost motion and expense involved in these complicated systems that have grown up with the centralization of control.

Even the officers in such organization are restricted by the scattered ownership and the limitations imposed upon them because of the character of the financial control. While the medium size organization with its ownership centralized largely in its active officials can decide a policy at short notice and with no great discussion, the question of such a policy must roll through a larger organization from the local head to the general management, thence to the directors, and, frequently, thence to the officers and the financial committee, before any change can be made. This consumes an enormous amount of time, effort and expense. It reduces the flexibility of the organization. Even the officers must consult the traditions, the rules and the regulations of the concern before they can take any radical steps that may be required by the economic changes.

The rapidity of action decreases from top to bottom of the establishment. The flexibility of movement required for rapid progress is less possible and the initiative itself is decreased by the difficulty of seeing the

visible results of the suggestion or the improvement, upon which the individual supervisor or executive has put his energies.

The man who has been handling one factory as a production man is called upon through the exigencies of such organization to preside over the operations of twenty factories and enormous distributing and marketing problems. Nothing in his past experience has fitted him for this responsibility. As the general manager of one factory, he has been governed by the rules and regulations of the executive offices, and irritated by the length of time and red tape involved in the discussions of any new question. Faced with a new problem, he finds himself obliged to accede to the routine of decision, the centralized operations of the system as it is already established, and to depend upon traditional methods very largely for his own government of the matter.

Leadership is possible in a very definite sense in an organization of medium size. There is no training for leadership in the organization of vast size. The man who becomes the head of such organization arises from some specialized branch in the financial, production, or marketing organization. The interrelated economic problems, production necessities, sales operations require an understanding of fundamental business which he has had neither the opportunity nor the necessity to secure.

In a lesser degree this is true all through the executive organization of the dominating concern.

The present position of such organization is no justification of it as an economic unit and the tendency to decrease individual efficiency in all the elements of operation and management, is likely to change the economic position of such organizations in many lines of industry in the future.

Some lines of business require, because of their physical necessities, the co-ordination of large groups, but for the majority of businesses this co-ordination is not necessary and is economically unsound from a human standpoint, because of the diminishing returns in human efficiency.

The questions put to executives of dominating establishments in several lines of industry have brought the admittance that they cannot compete with medium size concerns in the same line. If the economic speed of development of the past twenty years were to be maintained, this would not be so important, but the evidence is that the economic development in the future will be more difficult, harder to realize and require a greater degree of efficiency in order to secure it.

The law of diminishing returns has its reflex in the grouping of individuals in production in just the same way as it operates to increase the cost of the marketing. This means that it becomes more and more difficult to secure a high efficiency in the individual as the number in the centralized system grows.

The industrial engineers who have begun to bend their energies to the work of decentralization are working along lines that suggest possibilities of improvement in connection with the deeper problems of industrial operation.

Time Study Methods

"TIME Study and Job Analysis" is the title of a new book by William O. Lichtner, consulting engineer in management and construction. The book enters into a detailed study of production standardization and offers suggestions and results of actual experiences in this work.

The first chapters of the publication deal with the principles of job standardization and the author enters into the applications of these principles to methods of time study and job analysis. He also points out the necessity of securing the right man as an analyst in a plant and the various qualifications he must possess. This portion of the book, however, is mainly a review of what most men in industry know, and is used as a background for the other points brought out in the rest of the work.

Training the personnel of the department that makes time studies and works out methods for increasing production is a subject Mr. Lichtner places considerable emphasis upon. He points out that the work is somewhat in its embryonic stage, and comparatively few specialists have been developed along that line. The necessity for training men in the department is generally recognized, and a method for this sort of work is described in the book. Clerks and others are given an opportunity to develop into assistant analysts by this method, which he calls a "Non-Intensive Course in Training." This training is accomplished while the employee is actually at work and is done under the direction of the man at the head of the department.

An intensive course, however, is recommended in plants of any considerable size. This course would be under the direction of an instructor, and while those enjoying its advantages would be employed in the department, the course would be a thing apart from their work. Time study is the thing upon which most stress is laid. Mr. Lichtner would base the course upon the four following principles:

1. Instruction in the use of the stop watch and time study sheets.
2. Instruction in the fundamentals and technique of time study by means of exercises in the office.
3. Practice in use of slide rule.
4. Practice in field work.

A detailed description of how this course should be given is contained in the book. Mr. Lichtner points out the necessity for cooperation between the analyst and the workmen in the factory and especially for establishing pleasant relationships with the various foremen with whom he comes in contact. Methods of making time analyses are fully described throughout the book and various examples are given to show the value of such procedures. A thorough study of practically every element that enters into the subject is undertaken. The question of bonuses to employees comes in for a good share of discussion and a number of methods that have been successfully employed are described in detail.

Perhaps the most striking feature of the book throughout is the emphasis placed upon the value of maintaining agreeable relationships among the employees of a factory. The human side of the factory is just as important as the mechanical part, the author contends, and in determining time standards as much consideration should be shown the employee as the machine at which he works.

The book is illustrated with charts and diagrams, showing both the methods and results of various time studies. It is published by the Ronald Press Company, New York.

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Relations With the Dealer

IF manufacturers had long enough ears—the phrase is used figuratively and in no sense facetiously—to reach into the offices of their dealers they would hear these days many things about manufacturer-dealer relations which do not get to them through the reports of territorial travelers. They would hear dealers voice their opinions about contract relations, allotments and warehousing of cars, subjects which their travelers report with more or less regularity, but they would also hear the murmurings of a growing feeling among the merchants of the industry that manufacturers could do more, should do more, than they have in most cases to assist in the retailing of cars and in the maintaining of owner good will.

The manufacturers would find dealers battling with three major problems of their individual businesses—finance, sales and service. They would find a sentiment, while it upholds the independence of the dealer as an independent business man, that looks to the manufacturer for a broader co-operation in selling the car and keeping it sold.

The question of finance, vital as it is, has individual angles, as for instance such a situation as a well-to-do dealer handling the product of a manufacturer whose business is still in a stage of growth that limits his financial resources. But the fact remains that many dealers are going forward to-day because the manufacturer has intervened in one way or another to enable the dealer to obtain bank acceptance or corporation support for wholesale or retail financing.

The subjects of sales and service, on the other hand, are less involved, which accounts for the greater insistence on the part of dealers, hardly articulate yet, to be sure, that the manufacturer assume a larger burden of co-operation.

A dealer, with his manifold problems of management, sales and service, can hardly be expected to know the car and the reasons for its being built the way it is as well as the combined intelligences of his engineers and sales department know it. Catalogues and other descriptive literature have played their part in informing the dealer, but there can be, in many factory organizations, much more intensive study of retail selling problems than there has been and there should be a closer tie-up between the factory selling organization and the dealer sales staff, so that everybody will tell the same story about the car and tell it in the most effective way.

When we come to service we find a few brilliant examples of manufacturer-dealer co-operation in the preparation of service manuals, of records of time required for service operations and of flat rate guide books. But we find far more factories whose service literature is limited to instruction books for car users—and many of these are practically worthless. The factory has built a car and passed it on to the dealer to sell and service, but has told him nothing about how to service it. The doors are locked between the dealer and the wealth of information in the factory engineering department which ought to be adapted for use in the problem of making satisfied owners.

There has been some progress in factory recognition of the service problem, but it is far from being as rapid or as steady as it should be. There are still too many dealers experimenting on owners' cars to discover the best methods of performing certain repair operations and to learn what are fair prices for service work. And there are still too many factory service managers who do not enlighten the dealer on either of these problems.

Advantages of Light Alloy Pistons

LIGHT alloy pistons seem to have greater advantages for motor vehicle engines than has been imagined, if the tests recently conducted in Germany are a criterion. The advantages, moreover, do not seem to be limited to the field of high-speed passenger car engines, but to be particularly pronounced in the case of truck engines, which are governed to run at moderate speeds only. In the case of the truck engine on which the dynamometer tests were carried out, the maximum output was increased about 20 per cent without any increase in fuel consumption.

This increase in power and in fuel economy is evidently due to the use of a higher compression pressure which was found permissible with the alloy pistons. This is a factor which, so far as has come to our attention, has not been investigated in this country. We take it that in most cases in which alloy pistons have been substituted for gray iron pistons, the same compression ratio has been retained. With an engine otherwise well cooled, and especially one in which there are no valve plugs and in which the spark plug bosses are completely surrounded by water, the piston heads are undoubtedly the hottest points, which determine the limiting compression. The light alloys used for piston castings, such as aluminum and magnesium alloys, having a much higher heat conductivity than cast iron, the piston head does not get nearly as hot under otherwise similar conditions, and an increase in compression ratio is therefore permissible. It would probably not be safe to assume that the high compression ratio found the most advantageous by the German contest committee could be used with satisfaction in practice, as in the contest conditions were naturally the best; but the comparative results obtained with cast iron and alloy pistons are nevertheless suggestive.

It is also noteworthy that the best all-round results in the contest were obtained with a magnesium and not with an aluminum alloy. The earliest aluminum alloys used for piston castings had a small magnesium content and were known as magnalium alloys; but the alloys used in the prize-winning pistons in the contest consisted mainly of magnesium and did not contain any aluminum at all. Attempts have been made in this country to introduce magnesium alloys for piston use, but up to date no great amount of progress seems to have been made. It may be that engineers have been afraid of too rapid wear, as magnesium is a rather soft metal. It is, therefore, rather reassuring to learn that, according to the endurance tests made by the German contest committee, magnesium does not have to show a high scleroscope value to be satisfactory from the durability standpoint.

Heretofore manufacturers of light alloy pistons have regarded the high speed engine field as their best market, but these trials would seem to indicate that there is a large potential market for these pistons in the truck and tractor engine field.

Practical Optimism

IT is worth while to investigate the optimistic reports concerning certain phases of automotive business, because behind those optimistic reports lie sales. The fact that someone else has actually been able to do some profitable business in lines and places frowned upon by the pessimist, indicates that others may be able to develop similar markets.

Some export agencies in great shipping centers are specially vehement, for example, in declaring how dead the export trade is in automotive lines. Yet one truck manufacturer has just sent in a report that he has sold ten trucks to the Gold Coast, Africa. Another truck manufacturer has interested large South American interests in the flanged-wheel railway bus developed by his company.

Much depends upon the care with which markets are investigated and the methods with which such business is handled once a lead has been developed. Optimistic reports are valuable for more than merely making someone smile. They indicate the possibility of actually doing business.

Encouraging Kicks

MANY car owners have been dissatisfied with the service that has been rendered them on their cars. Manufacturers have only an indirect control over certain phases of this service, but exercise more direct influence on such factors as prices of parts, etc. The service departments of certain companies have come to see clearly the value of direct criticism and comment from owners of their cars. Engineering departments have gained information in this way; sales and service departments may be equally benefited.

The somewhat general dissatisfaction with service and parts prices is common knowledge, but the company which encourages direct criticism from its owners may be able to remedy faults in its own organization before they have hindered the sale of future vehicles. An owner wrote recently, for example, to a large car manufacturer, making the following statement:

"I have owned a Sennett car since 1917 and have derived considerable satisfaction from its use. However, when I have had occasion to replace parts, the charges made by your local parts department have been so exorbitant and outrageous in proportion to the obvious cost of the article delivered to me that I have determined as a matter of principle, if nothing else, never to buy another Sennett. . . . A canvass of the thoughts of various owners leads me to the conclusion that I am only one of the great army of car users who feel in this manner. . . ."

There was more to the letter, but the excerpt given presents the essential thought.

The manufacturer to whom this letter was written apparently was one of those who appreciate the value of such direct contacts with the user. The reply from the president of the company said in part: "I regret to note that the Sennett parts prices have not been satisfactory. . . . I have to agree with you that against present market costs many of the parts are a little out of line and you may rest assured that these matters will be adjusted as soon as possible. We are reorganizing many of our departments at the present time, and in a large plant such as ours it will require a few months still for us to arrive at safe new costs. . . . You need not hesitate to write us exactly what you think, for we are soliciting from our owners and dealers just such information as your letter gave. Thank you for the frank spirit of your letter."

The manufacturer who can sincerely thank an owner for a critical letter of this kind is well on the way to an analysis of his service problems which will ultimately lead to satisfied owners and resales.

Third Quarter Output Surprises

Compares Favorably with Period in 1920

Official Figures Show Aggregate of 511,510 Cars and Trucks Produced

NEW YORK, Nov. 22.—Official production figures showing a total output of 511,510 passenger cars and trucks for the third quarter of 1921 prove conclusively that the "slump" in the automotive industry has been more imaginary than real. This figure is only approximately 55,000 less than the production for the same period of last year which included two of the best months in 1920.

In July, August and September of this year there was a truck production of 37,322. This probably was about 7000 less than the output of commercial vehicles for the third quarter of 1920. While by far the greater portion of the trucks sold this year were light delivery vehicles, a comparison of the totals is impressive and demonstrates that a considerable number of trucks is going into service constantly.

It is perfectly safe to say that no commercial vehicles have been made for which there has not been an immediate market. The same is true, to a very large extent, of passenger cars. It is highly probable, however, that in the coming year the production of trucks will increase, proportionately, much more rapidly than that of motor cars.

While there are indications that there will be a considerable shrinkage in the number of individual manufacturers, the highway transportation industry is merely in its infancy and the next few years will witness a development which will parallel that of the passenger car. It will keep pace, in general, with improvement in general business conditions. Vocational selling will be intensified and it already is making rapid progress in many lines of industry.

The volume of sales has fallen off considerably since October in most sections of the country, although there are a few districts in which there has been little change. It is probable, however, that there will be a gradual decline until after the turn of the year.

The interest of the industry and of prospective purchasers is centered more closely than in years on the approaching New York and Chicago shows. As a consequence there is a disposition on the part of the public to delay purchases, except of inclosed models, until after that time.

An extraordinarily large number of new models will be displayed at the shows this year and some unusually interesting announcements are being withheld until that time by manufacturers.

Lang Body Co. Obtains Contract from Stutz

CLEVELAND, Nov. 21 — The Stutz Motor Car Co. of Indianapolis has released its entire production of enclosed bodies to the Lang Body Co. of this city. Work on the job will extend over a period of months.

The Lang body is being used on a Stutz four passenger coupé. It is a semi-custom built body, all aluminum, with broadcloth trimmings throughout. The enclosed model has been added to the company's line because of the increasing demand for this type of car. Plans for the model were made last year but production was delayed.

Lafayette, Lincoln and King also have turned their enclosed body work over to the Lang company. Business during November is far ahead of the volume for the same period in 1920, it is announced at the Lang plant.

Concordia Fire Insurance Drops Automobile Section

MILWAUKEE, Nov. 21—The action of the Concordia Fire Insurance Co. of Milwaukee, one of the largest stock companies in the Northwest, in discontinuing its automobile department has resulted in considerable agitation of conditions affecting all forms of insurance protection of motor vehicles. The only explanation of the Concordia's action is that "the unsatisfactory condition of the automobile business is responsible for the move."

TRUCK SALES MANAGERS TO MEET

WASHINGTON, Nov. 21 — Gordon Lee, chief of the automotive division, Bureau of Foreign and Domestic Commerce, Department of Commerce, will tell the National Association of Motor Truck Sales Managers in Detroit on Dec. 2 just what the Government is doing to promote interest in the automotive industry. He will appear as a special representative of Secretary of Commerce Hoover and will deliver an address at the cabinet officer's request.

Collins Reorganizes Peerless Personnel

Anibal Succeeds Strickland as Engineer; Cunliffe, Schmunk as Sales Manager

CLEVELAND, Nov. 21 — Reorganization of the personnel of the Peerless Motor Co. under the new management of R. H. Collins, president and general manager of the corporation, has been started with the appointment of B. H. Anibal as chief engineer to succeed W. R. Strickland, whose resignation has been accepted, and C. R. Cunliffe as general sales manager succeeding Robert J. Schmunk, also resigned.

For years Anibal has been with the General Motors Corp., resigning a short time ago to assist Collins in the development of his plans. He joined the Cadillac engineering staff in 1911 and assisted in designing in 1912 the 4-cylinder Cadillac which first used the electric self-starting system. He was also associated with the engineering department of the Oldsmobile. During the war he was connected in an engineering capacity with aircraft work for the Government.

Strickland, whom he succeeds, has been identified with Peerless for many years.

Cunliffe, who becomes general sales manager, has been regarded as one of the stars of the Cadillac distributing force. He was with the organization when Collins was president of the Cadillac Motor Car Co. and resigned as general manager of the Chicago Cadillac branch to come to Cleveland. Before going to Chicago he was manager of Cadillac in the Philadelphia district. In both cities he made fine records.

Schmunk resigns after a continuous service of 14 years with Peerless. He has not announced his plans for the future beyond a statement that he will take a much needed vacation, probably in California.

Ever since Collins took control of Peerless his engineers have been making an intensive study of conditions and an early announcement is expected of an aggressive campaign to increase sales and production.

WILLYS PLANS 50,000 OUTPUT

TOLEDO, Nov. 22—John N. Willys has announced after an inspection of the Willys-Overland plant here that he believes the company will be able to furnish employment to 12,000 men next year and that more than 50,000 cars will be required to meet the needs of Willys-Overland dealers in 1922.

Hanson Will Build New Car in Detroit

Product Will Sell Under $1,000 —Financial Backing Secured in South

DETROIT, Nov. 21 — Plans of the Hanson Motor Car Co. of Atlanta to manufacture in Detroit a new six cylinder car which will sell under $1,000 have been disclosed by negotiations entered into by President George W. Hanson for a permanent plant site and for a supply of parts for the new car with leading parts makers of the district.

Under the plans, as outlined, the Hanson Motor Car Co. would be expanded into a company with a capital of from $25,000,000 to $50,000,000. The former Hanson line will be continued in addition to the new line, the name of which has not been determined definitely but the new models will be displayed at the New York and Chicago shows, it is stated.

It is asserted that production of the new car will not be less than 50 a day. The plan is to manufacture both in Detroit and Atlanta. It is proposed to absorb several parts plants in the Detroit district into the new company so that the car, with the exception of several important units, would be entirely of Hanson construction.

Specifications for the new car were prepared in the offices of the Hanson company in Atlanta. President Hanson and the chief purchasing agent of his company have been in Detroit for some time consulting with the leading unit makers on the possibility of getting the parts required at costs which would permit a low selling price for the new line. It is declared that they have been entirely successful in this effort and that the new car will be in production early next year.

Aside from fuel economies which are claimed for a new engine which will be used, the car will be strictly conventional in design and operation.

In connection with the news of the Hanson expansion, it is learned that the company is not in any way connected with the proposed merger of a score of companies in the Associated Motor Industries recently incorporated in Delaware. It is understood here that the Hanson enterprise has strong financial backing in the South but the source of it has not been disclosed.

Receiver Is Appointed for Insurance Company

DES MOINES, Nov. 22—A. C. Savage, commissioner of insurance, announced to-day that the Interstate Automobile Insurance Co. of Rock Rapids had gone into the hands of a receiver. E. H. Hoyt, former State treasurer and now president of the Solidarity Finance Co. of Des Moines, has been named receiver.

The Interstate's liabilities are given as $930,000, including $200,000 capital, and its assets as $681,000, making a deficit of $249,000. The company has been in trouble for nearly a year. It wrote a very large volume of automobile fire and theft insurance in proportion to its resources and, according to its own statement as of Dec. 31, 1920, had less than $21,000 net surplus left, though $135,000 had been contributed to surplus during 1920.

It sought to reinsure all or part of its automobile business and go into the general fire business, but agents protested against conference companies helping a non-conference company out of its troubles by reinsuring its business.

Lubrication Discussed by Metropolitan S. A. E.

NEW YORK, Nov. 21—At the regular monthly meeting of the Metropolitan Section of the Society of Automotive Engineers held at the Automobile Club of America, Cornelius T. Myers presented a paper on the subject of "Chassis Lubrication." The author pointed out the need for more convenient and effective lubricating means than are usually employed, gave estimates of the great loss which results from failure to lubricate chassis parts properly, and described and compared various lubricating devices and systems now on the market, as well as certain types of spring shackles which require no lubricant.

H. L. Hoyt of the Belflex Corp. gave a detailed decription of the fabric shackles developed by that company. An interesting discussion followed the meeting which was attended by 110 members and guests.

David Beecroft, president of the society, gave a brief informal talk on present business conditions in the industry, following the dinner which preceded the meeting. A straw vote on the most desirable place at which to hold the summer meeting of the society showed that a large majority of members present at the section meeting favored Lake Placid.

RECEIVER FOR SEYMOUR

MILWAUKEE, Nov. 21—The Seymour Laboratories Units, Inc., manufacturer of automotive parts, has been placed in the hands of a receiver on application of the Matthew Addy Co. of Cleveland. Julius J. Goetz has been appointed receiver. The Seymour company was organized about a year ago and opened a plant to manufacture piston rings, pistons, and similar specialties for the automotive industries. It is incorporated for $300,000. W. E. Seymour was the founder and president.

TALKS ON TRUCK SELLING

PHILADELPHIA, Nov. 20—The importance of selling motor trucks on a clean, business-like basis was stressed at the November meeting of the Motor Truck Association of Philadelphia, by J. H. Feely, of the Autocar Co., who asserted that the tendency to do this has been notably increased on the part of manufacturer, distributor and salesman.

Seiberling Charters $55,000,000 Company

Will Introduce New Cord Tire— Two Plants Will Be Operated

AKRON, O., Nov. 19.—Frank A. Seiberling with his brother Charles W. Seiberling and other former Goodyear officials, has formed the Seiberling Rubber Co., chartered under the laws of the State of Delaware. Although the Delaware charter shows incorporation for $55,000,000 the actual incorporation is for $10,000.

The company, Seiberling announces will issue 50,000 shares of preferred stock at $100 a share and 500,000 shares of common stock of a no par value. Under Delaware laws this common stock for incorporation purposes is given a valuation of $100 a share. The common stock, however, will be issued on a valuation basis of $10 a share.

Offices in Akron

The new company, with general offices in Akron, will control and operate two tire building plants, the Lehigh plant at New Castle, Pa., with a capacity of 2,000 tires and 4,000 tubes a day, and the Portage plant at Barberton with a capacity of 3000 tires and 2000 tubes, giving Seiberling a production capacity of 5,000 tires and 6,000 tubes daily. The Portage plant, Seiberling has purchased for $750,000.

Seiberling was also a bidder for the Republic Rubber Co., of Youngstown, which is in receivership, and although he has announced that he was no longer interested, it is still reported that he may obtain this plant.

Associated with Seiberling will be his brother Charles, former Goodyear vice-president; W. E. Palmer, former Goodyear secretary; I. R. Bailey, former Goodyear assistant sales manager; and W. A. M. Vaughn, until recently secretary and treasurer of the California Goodyear Co. Other Goodyear men also have joined the Seiberling organization. Roy Ellsworth will be Seiberling's secretary.

To Market New Tire

Officers of the new company will be F. A. Seiberling, president; C. W. Seiberling, vice-president; W. E. Palmer, secretary; W. A. M. Vaughn, treasurer; I. R. Bailey, sales manager; William S. Wolfe, factory manager; Harold King, director of sales personnel; Karl Kilborn, manager of the development department; and W. P. Keith, in charge of laboratories.

The Seiberling company, it is announced, expects to introduce an entirely new cord tire which will be built along radically different basic principles and which can be produced at a lower manufacturing cost.

The company will manufacture automobile and motor truck tires of all sizes and types, specializing in cords for automobiles and pneumatics for trucks.

Automotive Exports Continue Increase

Figures Indicate Decidedly Upward Trend of Business in Foreign Markets

WASHINGTON, Nov. 21—The October exports of automotive equipment showed a distinct gain in all major items over those of the preceding month, as announced to-day by the Bureau of Foreign and Domestic Commerce, thus testifying in official figures to the statement frequently made in the trade that foreign business is decidedly upward. Passenger cars, trucks and parts each figured in the gains and for the first time in many months each of these items was at a volume larger than during the preceding month.

Price Cuts Affect Showing

The detailed figures published herewith show the comparison of the October shipments with those of the same month a year ago and with the totals for the ten-month period of each year. Exporters, however, are but little interested in such a comparison, their interest being of the more immediate rise or fall from month to month of the current business. The October figures, showing the improvement in business, should be rereived by them as an augury that future months hold more than the early part of the year. A comparison for the last three months follows:

	Cars		Trucks		Parts
	No.	Value	No.	Value	Value
Oct.	2,329	$1,952,641	595	$755,096	$2,702,002
Sep.	2,197	1,870,770	472	481,664	2,570,860
Aug.	2,237	2,265,328	381	434,052	1,786,886

The total value of the automotive export trade, tires not included, reached in October a value of $5,834,245, a gain of slightly less than three-quarters of a million over the month of September. Many price declines came into effect during the latter month and that served, of course, to reduce the actual valuation. This gain would have been more impressive, without doubt, if the cars, trucks and parts had been priced on the same levels during the two months.

Motorcycles Decline

These totals include airplanes and parts, motorcycles, motor trucks, passenger cars, automotive parts and the engines that come under the categories of automobile, marine, stationary and tractor. Airplanes, motorcycles and engines in October were under those of the preceding month and consequently all of the gain was recorded in the three major classifications. Motorcycles dropped from 627 with a value of $151,380 in September to 444 valued at $115,271, engine shipments declined an approximate $6,000 to $296,814, and the airplane shipments were some $22,000 under those of September.

The automotive exports for the first ten months of this year have reached the imposing total of $83,359,611, which is approximately 34 per cent of the total shown for the corresponding period of last year. This figure will probably come as a surprise to many exporters, who have based their calculations on the existing markets solely in a comparison of the number of passenger cars sold. Cars, it is true, have declined materially but the shipments of parts have been at a higher level, giving a firmer tone to the market as a whole.

Trucks Best Since March

The October shipments of cars, trucks and parts were the largest for many months. Truck shipments were the largest since April and March, although in those two months the figures were in each case only 14 and 11 higher. Consequently, we must go back to February and January to find appreciably higher truck exports than in October. The car sales were larger in May, April and February, but in each of these months the number was within 100 to 150 of the October shipments, and thus it is necessary to go back to January to find a much higher level. This also is practically true in regard to parts, although the actual value was slightly higher in May, April, March and February.

Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for October and Nine Previous Months

	Month of October				10 Months Ending Oct. 31			
	1920		1921		1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	10	$147,600	1	$8,000	56	$546,174	44	$279,940
Airplane parts	....	6,811	....	4,421	....	523,500	....	136,955
Commercial cars	2,345	4,025,161	595	755,096	24,549	38,618,018	6,540	9,469,719
Motorcycles	3,161	969,793	444	115,271	29,740	8,242,180	9,684	3,126,557
Passenger cars	11,562	14,699,402	2,329	1,952,641	121,788	139,098,944	26,229	28,331,253
Parts, not including engines and tires	....	6,910,538	....	2,702,002	....	69,337,409	....	33,828,455

ENGINES

	Month of October				10 Months Ending Oct. 31			
	1920		1921		1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobile, gas	496	$128 158	424	$92 553	30,025	$4,904,539	7,001	$1,482,701
Marine, gas	619	255,628	114	32,544	8,129	2,663,656	3,706	1,316,435
Stationary, gas	2,844	472,399	582	97,419	25,381	4,470,615	8,513	1,998,825
Tractor, gas	1,543	1.679,076	39	74,298	19,177	18,513,529	2,736	3,388,771
Total	5.502	$2 536,261	1,159	$296 814	82,713	$30,552,339	21,956	$8,186,732

IMPORTS

	Month of October				10 Months Ending Oct. 31			
	1920		1921		1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobiles (imports)	41	$63,487	62	$75,074	787	$858,397	461	$773,845
Automobiles returning to point of manufacture (re-imports)	459	522,089	130	237,187	4,849	7,718,372	3,312	5,258,944

SANFORD PRESIDENT DIES

SYRACUSE, Nov. 21—J. Frank Durston, president of the Sanford Motor Truck Co. and the Durston Gear Corp., died last week at his home here at the age of 79 years.

Receiver Will Continue Southern Truck Business

GREENSBORO, N. C., Nov. 21—Judge James L. Webb in Superior Court here signed an order authorizing Garland Daniel, receiver, to continue operation of the Southern Truck & Car Corp. of this city until the January term of court convenes.

Since the appointment of the receiver the indebtedness has been decreased from $61,269.04 to $38,627.15. The assets of the company are given at $53,871.07, leaving the net worth of the company at $15,243.92. The receiver is authorized to settle with the creditors at 40 cents on the dollar at once if they are willing to accept this settlement, with the exception of a note for $10,000 which would be paid in full, under arrangements which have been made.

BOCK BEARING PLANT SOLD

TOLEDO, Nov. 22—The plant of the Bock Bearing Co. in this city has been purchased by H. W. Bigelow, Jr., from the Standard Parts Co. He is understood to have purchased it as an investment and negotiations are pending for the leasing of the property to some operating company. The plant formerly manufactured roller bearings for the Standard Parts Co. but has been idle for several months. It was one of the units which the Standard Parts Co. creditors and stockholders decided soon after the receivership to place on the market.

Income Tax Relief Sought on Used Cars

Indiana Trade Association Also Takes Action on Highway Program

INDIANAPOLIS, Nov. 21.—Federal action permitting automobile dealers to deduct from income taxables the depreciation on used cars was sought by a resolution adopted at the convention of the Indiana Automotive Trade Association convention which was held here. It was the first state convention to take action on the subject and a similar course was urged on other state and local associations. The present income tax law permits deduction of used car depreciation only when the car has actually been sold at a loss.

Another resolution adopted the report of the highway program committee to be presented to state authorities. Specific facts presented show the need of a more permanent road program and the abandonment of gravel for the main intercounty and market highways by Indiana. It calls for immediate action that $4,500,000 of Federal aid funds still unused be saved for the state by getting all Federal aid projects under construction by next June after which money not so covered reverts to the government. Gravel construction costs $15,000 per mile, for maintenance. If $15,000 per mile is spent annually, in 10 years gravel road money would provide a Federal aid hard road to last 20 years.

Officers elected were: president, J. Cooper Props, Muncie; vice-president, M. Johnson, Vincennes; treasurer, R. V. Law, Indianapolis; secretary, Lynn M. Shaw, Indianapolis.

Taking Steps to Organize Pacific Section of S. A. E.

SAN FRANCISCO, Nov. 19—A meeting as part of a movement to form a Pacific section of the Society of Automotive Engineers was held here last night at which there were present automobile men, shop foremen, marine engineers, aeronautical engineers and others actively interested in automotive engineering problems. The principal address of the evening was made by F. E. Moskovics, vice-president of the Nordyke & Marmon Co. and a former officer of the society.

The prime movers in the organization of the section are Frank B. Drake of the Johnson Gear Works, A. H. Coates, president of the A. H. Coates Co., and A. H. MacCallum of the S. K. F. Industries.

STUDENTS INSPECT PLANTS

DETROIT, Nov. 21—Students of the Michigan State Auto School have been taking advantage of the opportunity to inspect Detroit's big automobile plants in connection with their course of advanced mechanical training here. This week different contingents of the student body have visited the new Cadillac plant, the Studebaker plant No. 3, the Dodge and the Ford plants. These men have come to Detroit from all over the country and in fact from all over the world, to study automotive mechanics and the automobile business at the center of this great industry.

Court of Appeals Denies Godsol Commission Claim

BALTIMORE, Nov. 21—The Maryland Court of Appeals, in an opinion prepared by Judge Thomas, denied the claim of Frank J. Godsol for commissions amounting to $5,590,970 in a suit brought against the Nash Motors Co. The claim was based on the sale of motor trucks to the United States Government during the war, many of which were used on the battlefields of France.

Godsol's case rested upon a contract entered into on Aug. 3, 1915, for sales made to the American Government. The defendant's claim was upheld in that the sales were not covered by the terms of the contract.

In its decision affirming the lower tribunal's decision, the Court of Appeals points to the fact that the trucks were sold by the manufacturer directly or indirectly to the United States Government, and not for resale in France, and that the several thousand or more trucks sent overseas were for the use of the American army during the war.

Production by Hendee Continues to Increase

SPRINGFIELD, MASS., Nov. 21—Hendee Mfg. Co. continues to increase production and is now operating with a force of more than 1000. Ole Bendixen, sales representative for Denmark, with headquarters in Copenhagen, has just paid a visit to the plant and has given a large order for motorcycles for early delivery.

B. R. Hunt, South African representative, arrived a few days ago from Johannesburg and reports good prospects for the coming spring. The two have sailed to attend the motorcycle show in London. Hendee production program calls for 20,000 cycles this season.

Oregon New Car Trade Improves in October

PORTLAND, ORE., Nov. 21—Business in the new car field was uniformly better throughout the State of Oregon during October than September. This rather surprising and encouraging situation is shown by the new car license figures for the month.

Further than this, October proved as good, and in some cases better, for new car business than did August. Thus far in November business has been as good as was the case during the first part of October, and indications point to a substantial and steady fall business.

Metal Trades Show Greater Operations

Secretary of Association Predicts Return to Normal by Middle of 1922

MILWAUKEE, Nov. 21—An optimistic report on the business outlook of the metal trades in Milwaukee, among which the automotive industries are prominent, as this is one of the principal sources of parts and equipment in the United States, is given by W. J. Fairbairn, secretary and manager of the Milwaukee Metal Trades and Founders Association.

Within the last thirty days there has been an increase of more than 7 per cent in the number of man-hours worked in the 50 shops embraced by the association. About 11,000 men are employed, compared with 20,000 in normal times. The low point was passed during August when operations were on a basis of 38 per cent of capacity. Now the active ratio is from 45 to 47 per cent. Fairbairn looks for steady improvement, but says this will be more noticeable after Jan. 1 than between now and the end of 1921.

Wages Decreased

Wages in the metal trades have decreased about 15 per cent. The wage problem, Fairbairn says, is complicated by the fact that the choicest workmen are now left in plants and their efficiency will be greater than the next 10,000 taken on for employment as the industry improves.

"Cycles of trade depression usually run from three to three and one-half years," said Fairbairn. "This was upset to some extent by the war, but this is the normal cycle of trade—about one and one-half years down and the same period needed to get back again. I look for a steady upward trend in activity for the next one and one-half years. The improvement will not be so noticeable before Jan. 1, but orders should increase so that there will be a much better showing by March and April, judging from experience in past years. By the middle of 1923 business should be back close to normal."

Automotive shops, as a rule, have been able to increase operations in November over October, which was slightly under September. December shipment orders are of such volume that the November schedules doubtless will experience a slight increase. In the parts industry the situation is regarded as more promising than it has been since early last spring.

TO BUILD NEW ROADSTER

TOLEDO, Nov. 21—The Automotive Corp. states that its new small model roadster will be in production about Jan. 1. The engine will be four-cylinder and air-cooled. The car will weigh 1000 pounds and will have a 48-inch tread and a 95-inch wheelbase. It will sell for $475. The company was incorporated originally to manufacture tractors but has temporarily left that field.

States Alter Trucks for Use on Highways

Change Bodies of Surplus War Material Transferred to Meet New Needs

WASHINGTON, Nov. 23—Approximately 30,000 surplus motor vehicles, inclusive of trucks and automobiles, turned over to the Bureau of Public Roads from the War Department have been transferred to the various state highways. In addition the bureau has taken over from the department spare parts to the value of $12,000,000.

In the dispute as to legislative action in disposing of this material, either by sales to the public or transfer to the Department of Agriculture for use on highways, the industry has generally taken the position that it would be best to have distribution made immediately. This attitude arose under the assumption that the quick absorption of the material by the state highway departments would hasten the demand for replacement and thus increase the sales of manufacturers and dealers.

22,000 Transferred

In order to protect motor truck and automobile owners and dealers, the authorization for the transfer of this material is given in the Wadsworth-Kahn act which provides that the material shall be used only in the construction and maintenance of roads.

The motor trucks, of which over 22,000 have been transferred, are perhaps the most valuable equipment handed over to the states. As they were received from the Army they were not generally suitable for road construction purposes, on account of the shape and size of their bodies, which were designed especially for Army use. But the states have altered these bodies, in some cases in their own shops built for the purpose, thereby converting the trucks to a number of special uses.

Changes Made in Bodies

The majority of the trucks have been changed by substituting dump bodies and hoisting devices for the cargo and ammunition bodies with which they were equipped when received. In some cases new bodies have been built outright; in others the Army bodies have been converted. Idaho, for example, has altered the steel ammunition bodies into hopper bodies by installing false bottoms sloping from front and back to a pair of drop doors for bottom dumping which is controlled from the driver's seat. Maine has removed the cargo body from the chassis and by pivoting it near the rear end and adding a hoisting device has made the Army body into a dump body. The same State and also Vermont have altered the Army bodies by arranging the sides so that they can be dropped or raised, permitting the load to be dumped from the side of the truck.

Arizona sized up the trucks equipped with steel ordnance bodies and decided that for road work they were too high and not wide enough. To make them suitable they cut the bottoms in half from front to back and then used the sides for a new bottom and the two halves of the bottom for the new sides, thus making the body about twice as wide and half as high. The change makes it easier to shovel into the truck when necessary and also permits the hauling of more bulky material. In addition the trucks have been equipped with hand hoists and offset bars on the rear end in order to pull blades and drags.

In addition to using the trucks for hauling road materials many of them have also been converted to other uses. Army ambulances have needed few alterations to make them admirable survey cars. Nearly all the states in which there is any snow problem at all have utilized a portion of their truck allotment in winter to push snow plows; and one of the other common conversions is that which results in a very serviceable sprinkler truck.

Storage Space Provided

Odd but ingenious use has been made by New Jersey of a truck originally intended as a water sprinkler and equipped with a centrifugal pump which was mounted beneath the tank and driven by the propeller shaft. This was changed to a machine for spraying whitewash on poles along the state highways.

Arizona has built a warehouse for the storage of its transferred equipment out of material also received from the Government. The sides of the 50 by 100 foot building are covered with corrugated iron, of which some 5,000 sheets have been distributed by the bureau.

In other states the problem of providing temporary storage space for transferred war material has been solved by the use of the canvas airplane hangars, several hundred of which have been distributed.

Burt Single Sleeve Valve Engine Introduced Here

INDIANAPOLIS, Nov. 21—Wallace Glasgow, Ltd., the parent licensing company of the Burt (Argyll) single sleeve valve engine, has opened offices in this country with headquarters in Indianapolis. This concern is now endeavoring to interest American manufacturers in the single sleeve engine for motorcycles and other purposes. The preliminary work, however, is being done with motorcycle engines, and sample engines have been under observation by some of the largest motorcycle manufacturers.

The Burt (or Burt-McCullum as it was formerly known) was originally introduced in 1911 and became well known through its use on the Argyll British and the Pic-Pic Swiss cars. The single sleeve has both a reciprocating and an angular rocking motion, which is imparted to it by a small crank on what corresponds to the camshaft in the ordinary engine. The latest design of Burt engine was described in AUTOMOTIVE INDUSTRIES of Dec. 23, 1920.

Willys Establishes New October Record

Plan of Distribution Given Credit —400 Dealers Added to Organization

TOLEDO, Nov. 21—Four hundred dealers have recently been added to the Willys-Overland organization under the new plan of that organization practically eliminating distributors.

"Our dealers," John N. Willys, president of the company, says, "have given us concrete evidence of the wisdom of our new sales distribution policy by enabling us to show what appears to be the largest sales last month of any October in our fourteen years in business."

The demand for enclosed cars has been exceptionally good the last few weeks.

Some difficulty has been experienced at the plant, however, in the paint shop. Workmen were given a cut in wages which brought them practically to the pre-war basis of pay. Without any organization they refused to work at the new scale and for the last week the shop has been advertising for high-class painters and finish men.

It is understood that a considerable number of cars are being turned out and sold to dealers unfinished.

The painters objected to the cut largely on the ground that their work was intermittent and that much lost time developed during the month. This is because the factory has been operating close to the margin on orders and inventory.

Government Will Sell Aeronautical Forgings

WASHINGTON, Nov. 21—Approximately 13,500,000 pounds of aeronautical motor forgings and castings will be sold by the Air Service within a few weeks. Informal bids will be received by the chief of the air service until Dec. 10. The forgings and castings will consist of ferrous and non-ferrous metals.

They are now located at the Long Island Air Reserve Depot, Long Island City, and are to be sold on the basis of scrap metals. The director of sales of the War Department announces that the quantities of metal being offered include 11,534,937 lb. of steel, 1,041,249 lb. of cast iron, 750,000 lb. of bronze, 189,000,022 lb. of aluminum, and 12,707 lb. of brass.

ALLEN CLAIMS FILED DEC. 8

COLUMBUS, Nov. 21—Notices have been issued by George A. Archer and William C. Willard, receivers for the Allen Motor Co., that all creditors having claims against the company or its receivers, or agents of either must file them with the receivers by Dec. 8, making proof under oath to the claim. This action is taken by order of the court preparatory to offering the plant and other assets of the company for sale at public auction.

Ford Will Develop Water Power Plan

Bids for Muscle Shoals Property Is Indicative of His Purpose

DETROIT, Nov. 21 — Statements made within the past few days by Henry Ford indicate his desire to develop hydro-electric power on a large scale in various sections of the country. This was his purpose when he filed with the Secretary of War his bid for the Muscle Shoals property and it is becoming apparent that it was what he had in mind chiefly when he put through successfully his plan for the development of power by damming the Hudson River at Green Island, near Troy, N. Y. While Ford contemplates the erection of a large plant at Green Island, work now is in progress only on the construction of the hydro-electric power plant.

Mississippi Surveyed

Ford has had engineers make a survey for the creation of a great lock system along the upper Mississippi which would provide an enormous amount of power. In this connection he said recently:

"The country is full of unused water power that should be harnessed and put to work. There is a fall of 400 feet in the Mississippi River between St. Louis and New Orleans and not a dam on the river."

He also asserted in a discussion of his plans for Muscle Shoals that:

"If the Government will let me go to work at Muscle Shoals I will establish a great aluminum plant in which aluminum will not only be extracted but manufactured into machinery parts. I will establish plants in which cotton will be spun and woven into cloth. I will put to work every horsepower that I can wring out of Muscle Shoals, no matter how many plants it will take to consume it."

Considers Packet Line

It is known that Ford's plans for the development of water power are bound up inextricably with his ideas of farm life in the future when all the arduous work shall be performed by machinery and when social life in the rural districts will be as pleasant and comfortable as in suburban communities.

Another ramification of his water power plan is the development of freight transport on inland waterways. He already is considering a plan to establish a packet line between Ironton, Ohio, and Paducah, Ky., in which a new type of river steamer will be used. These water lines would be operated in conjunction with his railroad properties.

WILLYS DEALERS MEET

ATLANTA, Nov. 21—Encouraging reports of Willys-Knight and Overland sales in the Southern field were made by prominent distributers who gathered in Atlanta for the first dealer meeting in the newly created district of Willys-Overland, Inc., of which Atlanta is the central distributing point.

George DeMack, distributer for the past 10 years at New Orleans, and Gus Johnson, manager of the Jacksonville, Fla., branch, both stated at the meeting that October sales were the largest in their respective territories that they have ever been during this month.

Utah Coal, Iron and Coke Companies Form Merger

SAN FRANCISCO, Nov. 21—An industrial combination which is of vital interest to the automotive industry, and especially to the automobile, motor truck and tractor manufacturing industry throughout the Pacific slope, has been accomplished here by the merger of the majority of the large coal, iron and coke companies of one entire section of Utah, with the iron and steel plants of California. Hitherto, the steel produced on the Pacific Coast had to be made from scrap iron, owing to the prohibitive rail rates on pig iron, coal and coke from the Pennsylvania production centers.

The new merger makes the Pacific Slope economically independent of these Eastern iron makers and should so cheapen the cost of steel on the Pacific Coast as to make much more attractive the manufacture of automotive vehicles either here or in southern California. The merger, which has been completed and officially announced, starts with a capitalization of $25,000,000, all paid in, $10,000,000 representing the value of the plants taken into the combination, and $15,000,000 to be used for development and expansion.

Bowlby Chosen to Head American Road Builders

NEW YORK, Nov. 21—The following officers were elected at the annual meeting of the American Road Builders Association held here: President, H. L. Bowlby, chief of the war materials division, U. S. Bureau of Public Roads; vice-presidents, Charles J. Bennett, State Highway Commissioner of Connecticut, New Haven, Conn.; Frank Page, chairman North Carolina State Highway Commission, Raleigh, N. C.; A. R. Hirst, State Highway Engineer of Wisconsin, Madison, Wis.; W. W. Crosby, National Park Service, Estes Park, Col.; scretary, E. L. Powers, editor, *Good Roads*, New York; treasurer, Senator James H. MacDonald, former State Highway Commissioner of Connecticut, New Haven, Conn.

BATTERY MEN TO MEET

DETROIT, Nov. 21—Storage battery men in the Detroit metropolitan district will hold an organization meeting on Dec. 8, for the purpose of forming a battery section of the Michigan Automotive Trade Association. A dinner will be tendered the battery men by the big distributors who are fostering the formation of the section to curb abuses which have beset the battery business.

Success Attending Argentine Exhibit

Points to Season Exceeding Expectations—American Lines Predominate at Show

BUENOS AIRES, ARGENTINA, Nov. 19 (By Cable)—The first week of the fourth annual Buenos Aires automobile show, which opened here on Nov. 12 and which will continue for another week, has been successful in every way. The local dealers and automotive representatives express themselves as being much encouraged by the success that has attended the showing thus far.

Show Unusually Important

Thirty-eight lines are represented in the show, which is held in the spacious Pavilion of the Roses, on one of the city's handsomest boulevards and near the beautiful Palermo Park. Twenty of these lines are American, eight are British and the remaining ten are French, Italian and German. Both 1921 and 1922 models are being shown. The domestic built custom and de luxe bodies are considered as one of the principal features and are attracting considerable attention.

This exhibition is held each year by the Automobile Club of Argentina, with which co-operates the Centro de Importadores de Automoviles y Anexos (Automobile and Accessory Importer's Association) and without doubt it is the largest automobile exhibition held in any part of Latin America. The current show is of more than unusual importance because of the business depression from which Argentina is now emerging and because of the general uncertainty concerning the course that the automotive trade would take for the remainder of this selling season. The success thus far encountered indicates that the season will be better than had been anticipated.

Sales Reported Brisk

Trucks, tractors and accessories, including tires, are well represented in the various exhibits in the halls and special exhibit rooms outside of the main floor. Although the show is primarily for the Buenos Aires public, many country dealers are reported to be present and interested in the cheaper models. The sales to the public are stated as being brisk, in some cases at increased prices due to exchange. Some lines have reduced their factory prices sufficiently to overcome the exchange handicap but others have been forced to increase prices.

NEW YORK, Nov. 21—According to the latest mail reports received from Buenos Aires, less than 1,000 cars were held in the custom house on Oct. 1 and more than 500 of these already had been paid for by the dealers. This supply, which consists of a few lines only, it was said then, would scarcely carry the dealers to the new year and that additional shipments probably would be required within a short time.

Ford Shows Steady Export Improvement

Better Sales Are Maintained in All Centers with Assembly Branches

DETROIT, Nov. 21—Steady improvement is being shown in the export business of the Ford Motor Co. and improved sales are reported from every center in which the company maintains foreign assembly branches. A statement on this point from the company shows that the export sales have reached an appreciable volume from the plants at Manchester, Copenhagen, Buenos Aires, and elsewhere. In addition, sales in Mexico are continuing on a level approximate with general business conditions in the United States and large shipments into that country are being made each month from the assembly plant at Houston, Texas.

Copenhagen at 100 Per Cent

In South America, the Buenos Aires assembly branch distributed 1650 cars in October in the Argentine, a number that will be equalled and probably exceeded in November. Sao Paulo, the assembly branch for Brazil, is operating on a smaller schedule than its southern neighbor but is showing steady improvement. This plant has about half the capacity of the Argentine branch. Other South American points are covered by direct shipment from New York and are steadily extending their demand for cars.

In Europe the Copenhagen plant which shipped about 700 cars in October is declared by Ford officials to be operating at almost 100 per cent. The output of the Copenhagen plant is absorbed in its entirety by the Scandinavian countries. These being neutral nations in the World War, their business is again close to normal proportions.

Continental Plants Gain

The Manchester, Eng., plant producing Ford cars, unlike the branches in other countries, is a manufacturing company, making approximately 80 per cent of the complete car. This business has shown large gains in recent months and is now on a basis of about 100 cars a day, these being sold in the British Isles exclusively. Continuation of increased buying in England, Ireland and Scotland is regarded as certain.

The Cadiz and Bordeaux assembly plants, which supply most of the other nations of Continental Europe, are operating on a reduced schedule, the company declining figures, but even here recent gains are reported. There is every intention on the part of the Ford company of locating a plant in Germany as soon as the situation is regarded as favorable. There is no direct business with Russia.

Ford Motor Co. of Canada, Ltd., which handles all Ford business in Canada and all British possessions aside from the British Isles, is operating on a four-day week schedule, whereas the Detroit plant is maintaining five-day operation. Canadian business has fallen off considerably with the approach of winter and will be further reduced as the northern winter sets in.

Shipments to South Africa and Australia are increasing in comparison to recent months. No figures are obtainable on these, but officials are satisfied that the end of the depression in these countries is at hand and that business will make steady advances from this time on. Business in the Far East, which has been dormant for many months, continues slow, but favorable sales movement is reported.

Pennsylvania Changes Truck Classification

HARRISBURG, Nov. 21—Changes in the classification of trucks with reference to chassis weights, fees, and maximum over-all weights allowed, are presented in the following table prepared by the automobile division of the State Highway Department:

Class	Chassis Weight	Pneumatic Tire Fee	Solid Tire Fee	Max. Cap.
AA	2,000-2,999	$24	$30	7,000
A	3,000-3,999	32	40	11,000
B	4,000-4,999	40	50	13,000
C	5,000-5,999	56	70	18,000
D	6,000-7,499	80	100	22,000
E	7,500-8,499	100	125	25,000
F	8,500 and over	140	200	26,000

Trucks having chassis weight of less than 2000 lb. are registered on the basis of horsepower rating, with minimum fee of $15. A truck-tractor with semi-trailer attachment is registered as one vehicle with fee computed according to table of weight and the fees specified for trucks and upon the basis of the chassis weight of the tractor, plus the weight of the attachment. The fee for registration of any trailer with metal tires is double the regular fee for trailers.

Olds Dealers Predict More Sales in South

MACON, GA., Nov. 27—A rapid return to normal financial conditions throughout the South with a steadily increasing volume of sales of passenger cars and trucks was predicted by Oldsmobile dealers of Georgia and other Southeastern States attending a special meeting here. A. B. C. Hardy, president of the Olds Motor Works, and Guy H. Peasley, general sales manager, attended the meeting explaining the company's business plans for the coming year and describing the 1922 models.

JERSEY CITY HOLDS SHOW

JERSEY CITY, Nov. 21—The second annual automobile show of the Hudson County Automotive Trade Association, which closed here to-day marks the opening of the 1921-1922 show season. A hearty reception was accorded it and the results obtained present a very optimistic outlook.

Creditors Present Plan for Obenberger

Bank Officers to Accept Second Mortgage Bonds to Settle Claims

MILWAUKEE, Nov. 21—The reorganization of the defunct John Obenberger Forge Co. of Milwaukee under the name of United States Forge Co., is set forth in a plan presented to the referee in bankruptcy by a committee of the principal creditors. The Obenberger company failed in December, 1920, with liabilities of $858,972 and assets of $1,778,329. The plant has been in operation for the last four months under the direction of the trustee, J. Frank Gerdis, previously secretary of the creditors' committee.

The reorganization plan is proposed by Walter Kasten, first vice-president of the First Wisconsin National Bank; Theodore Trecker, president of the Kearney & Trecker Corp., milling machines, and W. F. Kinsella, vice-president of the Worden-Allen Co., a large bridge and iron works concern of Milwaukee. It is proposed to issue $350,000 of 10-year, 6 per cent first mortgage bonds; $300,000 of 15-year, 6½ per cent second mortgage bonds; $375,000 of 7 per cent cumulative preferred stock, and 500,500 shares of common stock without par value.

Referee Considers Proposition

The First Wisconsin National Bank offers to accept the second mortgage bonds in full settlement of claims. The preferred stock is to be given to unsecured creditors and holders of preferred stock of the Obenberger company. The common stock issue is designed as a bonus to purchasers of the first mortgage bonds and would be used to pay the expense of reorganization. Secured creditors would receive $100,000 of first mortgage bonds, the remaining $250,000 to be sold. Each purchaser of a $100 bond would receive one share of common stock as a bonus. Owners of preferred stock would receive one share of preferred for each share, provided that they bought first mortgage bonds equivalent to the par value of their stock.

The proposal says that the net tangible assets of the United States Forge Co. would be $1,170,000 and its net quick assets $539,000.

The referee in bankruptcy has taken the proposition under consideration and expects to make a decision shortly.

RECEIVER FOR RUBBER PRODUCTS

NEW HAVEN, Nov. 21—Ernest J. Spitzer of Derby has been appointed temporary receiver of the Rubber Products Corporation upon application of the Ousatonic Water Power Co. by Judge Keeler of Supreme Court. His bond has been fixed at $10,000. The receiver has been directed to continue the business for one month.

Gordon Lee Visiting Automotive Centers

Government Official Starts on Tour That Will Cover Country

NEW YORK, Nov. 22—Gordon Lee, chief of the automotive division of the Bureau of Foreign and Domestic Commerce, reached New York City to-day on the first leg of a tour that will take him to the principal automotive manufacturing centers of the United States and on which he will discuss with many executives of the industry the future of foreign sales.

Lee is getting under way the co-operative work that this new division of Secretary Hoover's department has outlined, and his trip is to further this work, explaining it to the industry so that the fullest measure of assistance may be accorded to passenger car, truck, equipment and airplane makers.

While in New York, in addition to meeting company executives, Lee will confer with representatives of the National Automobile Chamber of Commerce, the Motor and Accessory Manufacturers Association, the Society of Automotive Engineers and the Manufacturers Aircraft Association. The purpose of these meetings is to form contact with these associations and to formulate policies of work contemplated. For instance, it is hoped that the S. A. E. will see fit to work with the division regarding the standardization of spare parts so that the service effort in the foreign field will be reduced to a minimum.

Lee's program follows:

Nov. 25, Rochester; Nov. 26, Buffalo; Dec. 2, Detroit, addressing the Motor Truck Sales Managers Association at Hotel Statler before returning to Washington; Dec. 13, Toledo; Dec. 13-18, Detroit; Dec. 19, Flint; Dec. 20, Lansing; Dec. 21, South Bend, and Dec. 22, Indianapolis.

Lee will be joined on this trip by William Irvine, also of the automotive division, who will leave the United States early next year for a trip of investigation through the Far East.

Efficiency and Economy Stressed in Bank Review

NEW YORK, Nov. 21—Business is better and sentiment throughout the country reflects courage, according to the review of business conditions for November issued by the National Bank of Commerce, one of the largest in New York. In discussing the business and credit situation the bank says:

"Such progress as has been made by the business community toward normal conditions results from a realization that artificial levels of activity will not again be reached in any period near enough to affect the problems of to-day, and from a determination to practice economies of operation more rigid than heretofore thought possible. The need of personal effort and economy is also being increasingly recognized in giving a day's work for a day's pay and in care as to personal expenditure. Business men and executives now recognize that henceforth they must give the most thorough personal attention and application to their enterprises.

"Some part of the recent gain in business is unquestionably a result of seasonal demand Permanent improvement depends to a large extent on foreign buying power, and even more on the adjustment of conditions under which the farmer operates. The last three years have clearly shown that the European situation can be stabilized only by the political and economic efforts of the countries concerned. Domestic conditions can be bettered by steady determination on the part of corporations and individuals to secure greater efficiency and to practice greater economy."

Oakland Will Continue Present Line for 1922

NEW YORK, Nov. 21—A statement asserting that the present Oakland line, "with gradual improvements," will be continued for the 1922 selling season, has been issued by P. S. duPont, president of General Motors Corp. His statement follows:

"It is but natural that there should have been constant gossip during the past few weeks while automobile price revisions were under way. The policies of General Motors Corp. with respect to certain of its manufacturing divisions were not immune, the future of Oakland being the subject of persistent rumors.

"This division is in a healthy condition, with its business stabilized and sales increasing. The present line of passenger cars, with gradual improvements, will be continued for the 1922 selling season. Thereafter, new models as may be required by the trade may be introduced."

Van Briggle Is Given Four Year Sentence

INDIANAPOLIS, Nov. 21—L. H. Van Briggle, former president of the Van Briggle Motor Devices Co., and Henry Rominger, former treasurer, were sentenced to Federal Prison for four years and for eighteen months respectively by Judge A. B. Anderson in the Federal Court. In addition, Van Briggle is to pay a fine of $1,000 and Rominger $500.

Both officials were indicted for the misuse of the mails and retracted their pleads of not guilty when the case was called for trial. Sentence was postponed at the time to permit Van Briggle to arrange his personal affairs.

NEW YORK WANTS BUSES

NEW YORK, Nov. 22—Mayor Hylan announced at a conference of city department heads, called to consider amendments to existing laws to be presented at the next session of the State Legislature, that the city would ask the Legislature again for authority to operate buses. "We are prepared to spend $10,000,000 in the purchase of well lighted, comfortable and well ventilated buses," he said.

Vacates Injunction Against Adria Motors

Trial Suggested by Court in Action Brought by Parenti Corporation

BATAVIA, N. Y., Nov. 21—Justice Harry L. Taylor of the New York State Supreme Court has handed down a decision vacating an injunction obtained by the Parenti Motors Corp. against the Adria Motor Car Corp. restraining the defendant from making automobiles which, it was alleged, imitated the Parenti car. The court holds that the merits of the case can soon be determined in a trial on its merits, "a method of quieting controversy far more satisfactory than that furnished by an order based on affidavits and pleadings."

In the argument on the injunction, Louis F. Vremsak, president of the Adria company, claimed that Parenti entered his employ in 1911 as a workman with no knowledge of automobile construction and that it "required painstaking effort to make of him a workman even of average ability."

Some Ideas Similar

In his decision Justice Taylor stated that Parenti evidently had indulged in much experimentation in endeavoring to produce a more satisfactory automobile. In his discussion of the case he said:

"It is quite possible that some of the ideas of Parenti and some of those ideas which have controlled the defendants in their conception and construction of the Adria car have been similar. It is also quite possible that the defendants have received inspiration from their former association with Parenti and vice versa. However, the injunction order as it stands is prolix in preliminary recitals, some of which are unwarranted.

"It is conceded upon the argument, for example, that the defendants are not offending in respect to the steering gear. In fact, it is somewhat difficult to determine from the affidavits and an examination of the drawings just what features of the Parenti car, which are really novel, have been or are being copied or imitated by the defendants; nor is the mind of the court led at all satisfactorily to the conclusion that the defendants have been or are offending in any of the material respects claimed."

The Adria corporation asserts that two models, a five-passenger touring car and five-passenger sedan, selling at $1,395 and $1,995 respectively, are being produced. The car will be marketed in Ohio by the Ohio Adria Motor Car Co., which is headed by A. W. Green, president of the Supreme Motors Corp.

DROPS MILEAGE GUARANTEE

CHICAGO, Nov. 21—The Mid-West Rubber Association, following the lead of the Rubber Association of America, at its last monthly meeting in Chicago decided to eliminate the tire mileage guarantee and to make all adjustments hereafter on the basis of defects in workmanship and material.

California Builds Longest Test Road

Thorough Experiments Are Made of Concrete Road Reinforced with Steel

SAN FRANCISCO, Nov. 21 — The longest and most expensive experiment in road building ever undertaken in the United States is now going on at Pittsburg, a few miles northeast of this city, under the auspices of the California State Automobile Association, with highway engineers from 17 States, nearly a score of army engineers, and road-building experts from all sections of the Pacific Slope on the ground to watch the tests and note the results.

Steel Company Interested

A test highway, oval and one-quarter of a mile in length, has been constructed by the Columbia Steel Co. of Pittsburg, Cal. This highway, which is 18 feet wide, is all concrete, but of 13 sections of widely varying types of construction, the thickness of the slabs varying from five to eight inches. The basis of the entire track, however, is adobe, that yellow mud which rivals southern gumbo in offering obstacles to the road-builder, yet the most common of all the basic materials encountered by the road builder in California.

Under each section of this highway, which is announced as costing approximately $50,000, observation tunnels have been constructed, and alongside are ditches which can be filled with water, so that the foundation of the road can be soaked to varying degrees in the different sections of the various materials. Instruments to record flexure caused by the loads on the top of the pavement have been installed in each of these tunnels.

Government Lends Trucks

The Federal Government has loaned 40 motor trucks ranging from 1½ to 5 tons, which are being driven constantly, night and day, around this track, all loaded to capacity, some in one direction and some in the other. This driving will be continued until the road has been destroyed. Records are being kept of the wear, resistance and endurance of each section, and, as soon as a section gives away, it will be repaired, so that the most enduring of all the sections may have full share of the wear and tear, the same as the weakest section, and the entire road remain usable until the last unit gives way. It is estimated that each section will bear the passage of 3000 to 4000 heavily loaded trucks every day, and the test, in addition to proving the various forms of concrete construction, will demonstrate the best method of repairing concrete roads for heavy traffic.

In case any section fails to yield to the truck traffic, the War Department has agreed to put heavy tractors, motor gun carriages and the new army tractor, weighing 28 tons and running at 25 miles an hour, over the road until it gives way under the strain. Close records are being kept, and the result should be a volume of invaluable data to all builders of concrete roads. The surface of the highway has been marked off into six-foot squares, and a separate record of each square, all of which are numbered, is kept so that the progress of cracks may be recorded, the spreading of small holes ascertained and all such detailed data kept in complete form.

Engineers Consulted

Before building this highway a questionnaire was sent to the highway engineer of each State, asking his views as to what forms of concrete highway construction should be included in the test. Federal engineers also were consulted, and the thirteen types of highway were selected for sectional demonstration.

Though the experimental track was constructed and the main burden of costs borne by the steel company, the road was laid under the complete supervision of engineers from the State Highway Department, and from the California State Automobile Association. The object of the Columbia Steel Co. in making this costly experiment is the demonstration, as one of the sections, of a reinforced concrete form of highway, devised by its engineers. One-quarter and three-eighths inch steel is used in this reinforcing, which makes of the highway virtually one side of a skyscraper, laid on the ground.

Uniform Car Taxes Probable for Philippines

LOS ANGELES, Nov. 21—Indications are that the fight that has long been waged by the automobile interests in the Philippine Islands for a uniform tax throughout the islands on motor vehicles will be crowned with success at an early date when the legislature tackles the tax question.

The newspapers in the islands have taken up the cry of the dealers that the automobile is an absolute necessity for the Philippines and that there is no use taking chances of injuring the industry by leaving the taxation question at the mercy of every municipal council.

The danger is illustrated by the trouble encountered in Manila where the municipal board has been determined to pass a heavy automobile tax ordinance irrespective of the insular tax.

"Some people argue that the automobile owner is more able to pay taxes than are other persons, as a general rule, and that therefore it is fitting and proper to go at it with vim and vigor," says an editorial in the *Manila Bulletin*.

"It should be remembered that the automobile owner already is paying the bulk of the taxes and there is a limit to jabbing him even though he does arouse the envy of some who are not able to ride in attractive cars. Let the tax be reasonable and uniform; let the automobile pay only its share of the taxes; let the motor industry be recognized as a vital part of our commercial life."

Exhibit at Olympia Is Dealer Success

Optimism Spreads to Makers and Public—Proves Popular Price Show

LONDON, Nov. 11 (*By Mail*)—The result of the 1921 automobile show, now nearing its close, has been as successful as it was unexpected. A fortnight ago manufacturers and dealers alike were discussing in dismal tones the prospects of the show and the 1922 season. Some firms would have welcomed a cancellation of the event until the declared restoration of other industries on which the car trade depends. The only factor favorable to the situation was the comparatively mild weather and the consequent prolongation of the touring season.

Public Cautious

Contrary to all expectations, however, the tone early became buoyant and orders began to be offered by the dealers. Their optimism spread to the makers. The formal opening day found the public interested but cautious. Even now it would be too much to say that the public or private buyer has bought freely. It is true, rather, that the dealers have filled the void and correspondingly both ensured a success to the show and the handling of next season's business through their class. The show is essentially a dealer's success and reflects more the unexpected optimism of dealers than the attractive program of the makers.

Moreover, it has been a popular-price show; cars of £300 to £450 having vastly the monopoly of interest to the public as buyers. The interest of both dealers and public centers in the small new-comers or runabouts.

Will Reduce Capital

There remains, however, the problem of the ways and means of the industry during the coming season or until production has well begun. The industry suffers from a legacy of the after-war boom months, 1919, to the early months of 1920. There is scarcely a company that has not to regret having greatly increased its capital, and to-day this item is reckoned in millions of dollars when before the war it seldom exceeded a million.

It is likely that this excessive capital will be reduced, because of the need to get prices back to something like the pre-war level, if only to re-establish the export trade. Allied with this aspect is the all-important factor of financing production to cope with the orders placed at the show.

MILBURN TO MAKE NEW TRUCK

TOLEDO, Nov. 22 — The Milburn Wagon Co. has announced that it soon will place on the market a new model electric truck. More men are being added to the working force.

S. A. E. Will Launch Aviation Campaign

Existing False Impressions Will Be Dissipated at Country Wide Meetings

NEW YORK, Nov. 21—The Society of Automotive Engineers will open a campaign the first of December and continue it through the month with the aim of showing to the public the truth about commercial aviation and dissipating many of the false impressions now existing. The plans of the society include meetings at nearly a dozen cities in widely separated sections of the country.

Will Review Situation

The speakers will include Admiral Moffett, head of the Navy Air Service; J. G. Vincent, vice-president in charge of engineering of the Packard Motor Car Co. and a past president of the Society; Glenn L. Martin, one of the pioneers in aviation and manufacturer in Cleveland of the Martin bombs; Ralph Upson, balloon expert, and Assistant Postmaster General Shaughnessy, who has charge of the air mail service for the Government.

These speakers will tell what has actually been done both in this country and in Europe in the way of commercial aviation, citing authoritative figures to show the number of planes now in operation, the number of miles flown during the past year, the percentage of successful flights and the number of accidents to planes attending to business, as contrasted with the much greater losses caused by spectacular flights or through the use of imperfectly designed machines or the operation of planes by insufficiently trained pilots.

The cost of aerial transport per passenger-mile and per ton-mile will be given, the figures being obtained from flights that have been actually made on regular schedules.

Free Discussions at Meetings

A number of the problems still to be solved will also be discussed freely at the meetings. Subjects that will receive attention in this connection are airways, landing fields, ground organization, legal aspects, radio and meteorological service and the relation of civil aviation to national defense. Moving pictures will be shown of the recent aerial bombing operations against the surrendered German battleships.

All meetings will be thrown open to the public, which includes laymen interested in aircraft.

The first meeting will be held Dec. 1 at St. Louis when Vincent will be the principal speaker. Indianapolis follows on Dec. 5 and Worcester on Dec. 9. Admiral Moffett has been invited to address the New York City meeting on Dec. 15. Martin will speak at Cleveland on Dec. 16, and Upson and Shaughnessy at Philadelphia on Dec. 22. Other meetings, for which definite dates have not been fixed, will be held during the month at Cincinnati, San Francisco, Buffalo and Detroit.

EXPRESS EXECUTIVE LAUDS MOTOR TRUCKS

NEW YORK. Nov. 18 — The following statement in reference to the value of the motor truck in commerce has been made by R. E. M. Cowie, vice-president of the American Railway Express Co.:

"The value of the motor vehicle as a means of transportation cannot be overestimated; the things that it has accomplished even thus far are marvelous in the extreme. From an experience of a great many years, with all types of transportation, I have come to the conclusion that there is very much of a distinct place for the motor vehicle, propelled by either electricity or gasoline.

"Until a few years ago the express traffic of the country was conducted very largely by horses and wagons, which are in these days regarded as a slow and tedious means of transport. It is very unfortunate that horse-drawn vehicles and motor vehicles have to operate on the same highways, because the horse-drawn vehicle is very apt to keep the speed of the traffic strained back, recognizing the theory that the speed of your fleet is the speed of the slowest collier in your fleet."

Farm Lighting Discussed by New England S. A. E.

SPRINGFIELD, MASS., Nov. 21—During the meeting here of the New England section of the Society of Automotive Engineers an inspection of the American Bosch Magneto Corp.'s plant was made.

Following a banquet at Hotel Kimball in the evening, E. B. Newill, engineer in charge of the isolated electric lighting plant section of the Westinghouse company in Pittsburgh, read a paper dealing with farm lighting plants. He described the improvements made in the construction of such plants and their increased importance in the economy of farm management.

TO CHANGE OHIO THEFT LAW

COLUMBUS, Nov. 21—Steps are being taken by officials of Franklin County and the Ohio Automobile Association to make necessary changes to the Atwood anti-theft law which, it is hoped, will still further reduce the thefts of cars. It is suggested that bills of sale should contain the names of the seller and buyer as well as make of cars and the engine numbers. At present only the name of the buyer appears.

Townsend to Renew Excise Tax Efforts

Will Carry Fight for Its Removal into Next Session of Congress

WASHINGTON, Nov. 23 — Senator Townsend of Michigan told AUTOMOTIVE INDUSTRIES to-day that he intended to carry the fight for the removal of the excise tax on automobiles into the next session. The passage of the tax measure retaining the excise tax on automobiles and trucks was a keen disappointment to the Michigan Senator, who had waged an aggressive, though unsuccessful battle against it. He is firmly convinced that it will be necessary within the next year to revise the tax bill as it passed the Congress, because of its inequities.

With price reductions common throughout the industry on practically all makes of cars and trucks, the tax item is an important factor in the situation. Senator Townsend feels that the conference on the limitation of armaments will have much to do with the removal of the excise tax. This belief is founded upon the fact that the larger proportion of the annual Federal appropriations are used in the maintenance of the military and naval establishment. The reduction of naval forces and the suspension of battleship construction would effect an enormous saving in expenditures, and, as a consequence, would reduce the need for taxes.

Senator Townsend is of the opinion that the economies resulting from this international action will lessen the opposition to the removal of excise tax. In his efforts to have the tax removed at the special session, he found that the principal opposition was to the elimination of this revenue.

University Inaugurates Tractor Repair Schools

BERKELEY, Nov. 21—The University of California has inaugurated tractor repair schools throughout the State, to be maintained in operation every day in the year except Sundays and national holidays, under the direction of the College of Agriculture. Actual repair work is done by the students, and there are no fixed hours for attendance, so as not to prevent men at work in the fields and especially farmers owning tractors, or their sons, from attending whenever it is most convenient for them.

Each school will have a competent repair man in charge, and three tractor experts from the agricultural engineering division of the University of California will spend their time from now on traveling from school to school, installing the repair plants and getting the teachers started. A nominal enrollment fee, to cover costs, is the only charge connected with these schools, and the students may remain enrolled as long as he likes.

Fisk Reduces Prices on Tires and Tubes

Other Companies Revise Lists, Goodyear Including All Lines for Trucks

CHICOPEE FALLS, Nov. 21—The Fisk Rubber Co. has reduced its prices of tires and tubes 10 per cent. to 33 1/3 per cent under previous schedules. A 30 x 3½ fabric casing now lists at $10.85, as compared with the previous price of $14.50, and $18.50 in November, 1920. The 34x4 cord casing at $32.50 compares with $48.95 previously, and $55.30 a year ago.

Truck Tire Prices Cut

AKRON, Nov. 21—The Goodyear Tire & Rubber Co. has cut motor truck tire prices, following the company's recent slash of automobile tire prices. The reductions average 15 per cent on all diamond tread solid tires, 10 per cent on pneumatic truck tires, 10 and 15 per cent on pneumatic truck tubes, 6 per cent on smooth solid tires and 10 per cent on cushion truck tires.

Michelin Reduces Prices

MILLTOWN, N. J., Nov. 21—The Michelin Tire Co. has reduced the price of its oversize cord tires up to 4½ in. sizes about 10 per cent. and its regular cords of all sizes between 6 and 12 per cent. A reduction has also been made of between 2 and 7 per cent on all fabrics.

New Prices for McGraw

CLEVELAND, Nov. 21—The McGraw Tire & Rubber Co. following the action of other manufacturers has made a reduction of from 6 to 14 per cent on its fabric tires and from 12 to 28 per cent on its cords.

Republic Revises Lists

NEW YORK, Nov. 21—Republic Rubber Co. announces that it has revised its price lists to be in accord practically with the general revisions in pneumatics now being put into effect by other tire manufacturers.

Mohawk Tires Lower

AKRON, Nov. 21—The Mohawk Rubber Co. has anounced a reduction of between 17 and 24 per cent on its cord tires; 10 and 20 per cent on its fabric tires and about 13 per cent on its tubes.

American Tire Reduced

NILES, OHIO, Nov. 21 — Effective immediately, the American Tire Corp. has made a downward revision of its prices as follows: On fabrics, 14 to 19 per cent; cords, 15 to 32 per cent; tubes, 12 to 18 per cent.

NEW DIXIE FLYER PRICES

LOUISVILLE, KY., Nov. 21—Kentucky Wagon Mfg. Co. has made a downward revision in the prices of the Dixie Flyer as follows:

	Old Price	New Price
Touring Car	$1,345	$1,195
Roadster	1,345	1,195
Speedster	1,545	1,395
Sport Touring	1,545	1,395
Sedan	1,995	1,895
Coupe	1,995	1,895

ROMER DOWN

BOSTON, Nov. 22—The Romer Motors Corp. has announced a reduction in price on its models as follows:

	Old Price	New Price
Roadster	$2,000	$1,975
5 passenger touring	2,000	1,975
7 passenger touring	2,100	2,050
Coupe	2,450	2,400
Sedan	2,750	2,700

CASE REDUCED

RACINE, WIS., Nov. 21—The J. I. Case Threshing Machine Co., announces a price reduction on its four and seven passenger cars from $2,250 to $1,935 and on its sedan from $3,285 to $2,970.

VICTOR PRICES REVISED

SPRINGFIELD, OHIO, Nov. 23—The Victor Rubber Co. has reduced its prices on cord tires 30 per cent and on fabric, 22 per cent. Prices have been reduced from 3 to 10 per cent on tubes.

Republic Arranges for Note Extensions

NEW YORK, Nov. 23—The Republic Motor Truck Co. has completed arrangements for the deposit and extension of $2,500,000 7 per cent mortgage notes outstanding by which the corporation would increase the rate to 8 per cent and agree to redeem $300,000 worth of the notes annually, beginning Nov. 1, 1923. The plan contemplates a five-year extension of the notes, $500,000 of which was due on Nov. 1. The remainder mature serially during the next two years.

Durant Motors of Indiana Completes Organization

NEW YORK, Nov. 23—The organization of the Durant Motor Car Co. of Indiana has been completed by the election of Hal W. Alger of Chicago as first vice-president in charge of sales and A. Henniger, who has been a member of the T. W. Warner organization, as second vice-president in charge of production. The other officers are: President, W. R. Willett; secretary, H. M. Herbermann; treasurer, C. F. Daly. Besides the officers the directors include T. W. Warner as chairman of the board, W. C. Durant and C. O. Miniger.

QUALITY STILL DOWN

ANDERSON, IND., Nov. 21 — The Quality Tire Mfg. Co., a $200,000 corporation that went into the hands of a receiver three weeks ago, is still inactive. Present indications are that it will be the middle of winter at least before definite action can be taken by the receiver.

Lincoln Receiver Resumes Operations

Question of Taxation Figures in Reorganization Plans of Company

DETROIT, Nov. 22—Manufacture of cars has been resumed at the plant of the Lincoln Motor Co. by the Detroit Trust Co., the receiver, upon completion of the physical inventory. Shipments for the month of November are expected to run about 100 cars and operations, pending final reorganization, will be conducted strictly on a sales basis. Details of the inventory are not available. The work of pricing the equipment and material at figures which the receiver considers fair is now in progress. An announcement on this subject is expected within a week.

There are several important points upon which reorganization plans hinge. One of them is a question of taxation which the receiver and attorneys for the company have taken up with the Federal Government at Washington and which is now under consideration.

Operations at the plant for the present will consist mainly of completion of cars which were in process at the time the receivership action was taken and which were held up pending the inventory. Dealers and distributers are placing orders, and the receiver reports approximately 100 since the court action was taken.

A stockholders' protective committee has been formed by the owners of Class A stock and steps are now being taken for the organization of a merchandise creditors' committee.

There has been much speculation as to the nature of the reorganization which is contemplated, but definite information on this subject is lacking. It is considered possible that the assets will be offered for sale and bid in by the interests now in control of the company.

SUIT RESULTS FROM FIRE

EDGERTON, WIS., Nov. 21—The Highway Trailer Co. has brought suit against the Janesville Electric Co., Janesville, Wis., to recover $250,000 damages growing out of the destruction of the main factory building on the night of July 4. It alleges that the electric company hampered the fire department by shutting off the power operating an electric pump, thus permitting the loss to grow beyond reasonable proportions. The loss was $360,000, with insurance of $100,000.

RAILWAY ORDERS TRUCKS

ROCKFORD, ILL., Nov. 21—Orders have been placed by the Rockford City Traction Co. for six White motor truck chassis, which will be equipped with bus bodies, delivery to be made on Jan. 15. The cost will be $42,000. These buses will be operated by the street car company as feeders to the trolley lines.

Reduced Car Taxes Sought by Japanese

Use of Automobiles Curtailed as Protest Against Existing High Rates

LOS ANGELES, Nov. 21—A determined fight has been launched by automobile dealers and automobile owners in Japan under the leadership of Toshio Fujiwara, president of the Naigai Kogyo Kaisha, Ltd., one of the foremost figures in automotive circles there, to obtain a reduction of the automobile tax now in force in Tokio, which is regarded as the highest tax of its kind in the world. The automobile taxes of other Japanese cities were also increased some time ago and are about as heavy as those imposed in Tokio.

Trade Is at Standstill

Information received here is to the effect that a few weeks ago the leading automobile dealers of Tokio presented a petition to the governor of Tokio, the mayor of Tokio, the prefectural assembly of Tokio and the municipal council of Tokio, in which relief from the prohibitive taxes was demanded. The petitioners asked the authorities for a reduction of the present tax to less than one-fifth, and further reductions on the rates on trucks and cars for hire to less than one-half of the rates reduced as recommended first.

Indications are that the campaign launched by the dealers and owners will bear fruit, as the automobile situation in Tokio, the automotive center of the Nipponese Empire, has been at a virtual standstill since the high taxes were levied some months ago.

Automobile Use Discontinued

When the automobile tax was first established in Tokio some years ago, it was 20 yen per car or truck, without regard to its horse power. Since then the rates have been revised several times, and last year they were raised so high that the tax on an automobile of 20 horsepower or more, including additional taxes, is 843 yen a year, and that on an automobile of 15 horsepower more than 590 yen a year. Such high rates of taxation put Japanese people connected with the automobile business in a very difficult position, and the users of automobiles are disgruntled at the attitude of the authorities concerned. Many of them have discontinued using automobiles to voice their protest.

As a matter of fact, at the time the new rates of taxation were put into effect last April, the owners of 507 automobiles in Tokio discontinued their use and since then 300 more have followed their example, according to figures compiled by Fujiwara. Over 25 per cent of the total number of taxable automobiles and trucks have disappeared from the streets in this way during the year.

"If the object of the authorities concerned is to prohibit the use of automobiles by imposing high rates of taxation it has been partially accomplished," Fujiwara is quoted as stating. "In other countries the number of automobiles in use is regarded as a barometer of the standard of that country's civilization. It is to be sincerely regretted that the use of automobiles is discouraged in Tokio by this heavy tax.

"Supposing that a healthy man weighs about 125 pounds in average, and that his weight has suddenly decreased by 25 pounds, he must be regarded as in an unhealthy condition, and even may be on his deathbed. The same may be said of the condition of automobile utility in Tokio, where about 25 per cent of the automobiles operating have disappeared in a few months on account of the ridiculous tax. The automobile business in Tokio is, so to speak, in an unhealthy condition.

"The present movement, started by the automobile dealers, is to cure this unhealthy situation."

Gasoline Consumption Declines in September

WASHINGTON, Nov. 21—The domestic consumption of gasoline fell off by 65,000,000 gal. for September and production declined by approximately 25,000 gal. a day, as compared with August. Stocks of gasoline on hand at refineries on Sept. 30 decreased by 52,000,000 gal. Exports also fell in line and decreased by nearly 13,000,000 gal., as compared with those of the preceding month. Shipments of gasoline to insular possessions, however, more than doubled. According to the statistics prepared by the Bureau of Mines, the production of gasoline for the first nine months of 1921 increased by 10 per cent over the production for the same period in 1920; imports of gasoline were decreased 17 per cent, exports decreased 15 per cent, shipments to the insular possessions gained 33 per cent, while the domestic consumption increased 6 per cent.

The daily average production of lubricating oils for September was 157,000 gal. larger than the production for the month of August. Stocks were decreased 12,300,000 gal. during the month. For the first nine months of 1921, the production of lubricating oils shows a decrease of 17 per cent; exports a loss of 35 per cent; shipments to insular possessions a decrease of 1 per cent, and domestic consumption a decrease of 21 per cent.

California Governor Upholds Road Methods

SAN FRANCISCO, Nov. 21—Governor William D. Stephens has taken a firm, and apparently immovable, stand back of the California State Highway Commission, in the controversy which the California State Automobile Association and the Southern California Automobile Club raised by their criticism of methods of road construction and use of State funds in that work.

Responsibility for the alleged inadequate road building policy of the State was placed on Governor Stephens by the California State Automobile Association.

METAL MARKETS

While the market for automotive steels is seasonably quiet, sufficient activity is in evidence, either by way of actual buying or tentative inquiries, to raise high steel producers' hopes for a steadily growing volume of business from the automotive industries, once the preliminaries for the season of 1922 get under way. In connection with these expectations the trade considers it as a good omen that stress is laid upon the relatively large amount of steel entering into garage construction at this time.

The alloy steel market, following a period of protracted idleness, seems to have taken on a new lease of life as the result of orders for a few hundred tons placed by passenger car builders and automotive specialty manufacturers. Quotations named by alloy steel specialists denote somewhat higher asking levels, but a survey of that branch of the steel industry shows that anxiety of producers to get really worth while orders on their books is sufficiently to the front to warrant confidence on the part of purchasing agents in their ability to secure all possible concessions within reason through individual negotiations.

Of course, the markets for nickel, chromium, vanadium and the other alloys, for many months in the doldrums, are certain to respond sooner or later to what increased demand will make itself felt as the result of a broadened demand for alloy steels from the automotive industries. In the sheet market, there have been rumors of quotations of as low as 4.00¢ for 22-gage full finished body sheets. Undoubtedly there have been attempts here and there to find out whether a concession of $5 to $7 a ton from the 4.35¢ price that has heretofore prevailed would bring out a worth while quota of orders.

The bulk of the ordinary sheets now being rolled applies to orders which were placed before the last advance or which are for account of buyers whom the mills agreed to protect against any price advances over the remainder of the year. Cleveland reports state that considerable tonnages of steel bars are being sought by manufacturers of automobile bumpers.

Pig Iron.—Automotive foundries are placing more orders. Most of this iron, however, is for early delivery. The first quarter 1922 market is still on a nominal basis, expectation of a downward revision of freight rates casting a haze over the situation and acting as a restraining factor.

Steel.—Strip steel producers are working at a relatively satisfactory rate, exceeding in the case of some mills 50 per cent of capacity. Most of the output, however, applies to specifications furnished on contracts carrying the 2.00¢ price on the hot-rolled and 3.75¢ on the cold-rolled. In the semi-finished market one still hears of sales of sheet bars at $30, Pittsburgh.

Aluminum.—There is a decided lessening in pressure on the market by German bargain offers. The lowest price for foreign ingots is now 18¢, duty paid. The sheet market is firmer. Considerable tonnages of foreign aluminum will arrive in the next few months but practically all of this metal is for account of consuming buyers and will in no wise increase the floating supply.

Copper.—The copper market is once more in the midst of one of its balloon ascensions. Part of the advance scored will undoubtedly stick, but, as usual, in such upward movements, there is a tendency to overstrain the market.

INDUSTRIAL NOTES

Leach Biltwell Motor Car Co. of Los Angeles, with the opening of its new foundry and casting department at the factory, is manufacturing the Leach car in its entirety in its own plant, with the exception of axles, starter and carbureter. The new department where aluminum, brass and other castings are made occupies a large building in the rear of the engine plant. New equipment is arriving daily for the foundry and other departments which will add greatly to efficiency and capacity. A schedule calling for 1200 cars in 1922 has been settled upon, although officials expect this program to be exceeded.

Winther Motors, Inc., recent consolidation of the Winther Motor Truck Co., Marwin Truck Corp. and Kenosha Wheel & Axle Co., all of Kenosha, Wis., has taken steps to provide more adequate facilities to accommodate development of all departments, including passenger and commercial cars, axles and wheels. There is now nearing completion a one-story factory addition, 62 x 386 ft., and it is said that further extensions are planned immediately after Jan. 1.

Steel Wheel Co. has been formed to handle the distribution of Gier Tuarc steel wheels, manufactured by the Motor Wheel Corp. of Lansing, in Greater New York, Newark, Jersey City and surrounding territory. The company is headed by Thomas J. Wetzel, who will also continue to represent the Motor Wheel Corp. in the East.

Marvel Battery Co. of Chaska, Minn., has moved to the St. Paul Midway, where greater facilities are offered for its increasing business. The company will produce from 200 to 500 batteries a day.

Huron Truck Co., Bad Axe, Mich., has been merged with the Ruggles Motor Truck Co., Saginaw.

Constantinople Tractor Trials Probably in May

WASHINGTON, Nov. 23—Postponement of tractor trials which were to be held at Constantinople in September, owing to military activities in the neighborhood and general economic conditions, brings the hope among foreign trade promotors that American tractor manufacturers will manifest more interest in these markets next spring, when it is proposed to hold the exhibition.

The assistant trade commissioner, Julian E. Gillespie, reported to the Department of Commerce that only three American companies were entered in the tractor trials scheduled for this fall. He believes that the date will be set in May and the Department of Commerce has notified tractor manufacturers and other exporters of this opportunity.

Sales Meetings Urged at Milwaukee Convention

MILWAUKEE, Nov. 21—Ludington Patton, head of the Patton-Pitcairn division of the Pittsburgh Plate Glass Co., a consolidation of the former Patton Paint Co. and Pitcairn Varnish Co., both of Milwaukee, discouraged the cancellation of sales conventions in an address at the annual fall sales conference of the sales managers and paint and varnish salesmen held in this city.

"America's business problem is no longer production, but selling," he said in the principal keynote address to the sales staff. "While economies are paramount under judicious business administration, they should not be achieved at any curtailment of effective selling effort, or at the cost of quality standards in commodities.

"The frequent cancellation of sales conventions by manufacturers as a means of ecomomy is a big mistake. Now is the time for sales conventions. Now is the time when the salesman and his house must be in close contact; when the salesmen need to be energized by house recognition; when he must be familiarized to the finest degree with his product, his house policies, and have the opportunity to learn of successful methods employed by fellow salesmen in other territories.

"The general retrenchment of national advertising is a considerable reflection on the advertisers concerned. Either they have not been buying advertising on the sound basis that it is an active selling power, or they are conspicuously unwise in retrenching now, when advertising is most needed to stimulate the buying idea. In our case we believe we are keeping faith with the dealers when we increase our advertising at a time when the dealers most need support."

British Committee Makes Anti-Dazzle Suggestions

LONDON, Nov. 7 (*By Mail*) — The third interim report of the Maybury Committee of the Ministry of Transport on dazzling headlights covers the following points by way of recommendation and comment:

(1) A reduction of the height of motor headlight beam is recommended so that the glare shall not come within the vision of cyclists and pedestrians, to which end it is suggested that the specification of a standard headlight should have a maximum height of 4 feet from the ground at 150 feet from the lamp, the lower edge impinging on the road not more than 50 feet from the face of the headlight.

(2) A minimum illumination for all vehicles is declared impracticable, and, in the event of a prosecution for driving to the danger of the public at night, it is recommended that the adequacy of the lights should be an element to be taken into consideration by the court.

(3) Swivelling or tilting headlights are dismissed as useful but too dependent on the courtesy of drivers.

(4) The use of an additional lamp fixed in a low position is suggested for use in fog, provided that its light projects downward and forward.

These recommendations though not to be taken as final, are likely to be embodied in the new Government legislation concerning automobiles and automobile traffic.

NO NEW CEYLON TARIFF

LONDON, Nov. 14 (*By Mail*)—The effort to control the Ceylon automobile market by a preferential tariff in favor of British cars has been abandoned because of the opposition evoked. Therefore all automobiles will continue to pay the same rate, 7½ per cent ad valorem, irrespective of their place of origin.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The district easing of money rates as evidenced in the quotations of the past week was a reflection in part of the gradual liquidation of frozen loans which has been going on for the last few months. Call money ranged from 4 per cent to 5½ per cent as compared with 5 per cent to 6 per cent in the previous week. Time money also showed an easier undertone, with quotations at 5 per cent to 5¼ per cent for all maturities from 60 days to 6 months as against 5 per cent to 5½ per cent for 60 and 90-day paper, and 5¼ per cent to 5½ per cent for the longer maturities in the previous week. Prime commercial paper remained at 5 per cent to 5¼ per cent. Although funds were more freely available, no large loans were negotiated.

In the Federal Reserve statement as of Novmber 16, the total reserve ratio showed a further increase for the week from 71.4 per cent to 71.8 per cent. Total reserves increased $8,685,000, which was accounted for by a gain of $7,602,000 in gold holdings and an increase of $1,083,000 in other cash reserves. The total deposits increased $10,851,000, while reserve notes in circulation decreased $22,607,000.

The total reserves of the New York institution increased $30,905,000, but there was a decline of $87,958,000 in total earning assets.

Sterling Reaches High Point

During the past week, sterling exchange rose above $4.00 to the pound, the highest point of the year. Several reasons are assigned to this rise, among which are included the betterment of Great Britain's export trade, and the improved internal economic condition following the adjustment of the difficulties with the coal miners. Last week also marked the seventh anniversary of the inauguration of the Federal Reserve System. On November 15, the New York Telephone Company offered $50,000,000 of 6 per cent Bonds at 97. This offering was oversubscribed nearly ten times, a fact which is significant not only of the demand of the investing public for sound securities but of the accumulation of funds seeking investment.

MAY BUY ALLEN PLANT

BUCYRUS, OHIO, Nov. 23—L. A. Sommer, designer of the motor for the Allen car, is understood to be negotiating with the receiver for the Allen Motor Car Co. with a view to purchasing the plant and using it to manufacture motors.

WILL SELL BETHLEHEM

ALLENTOWN, PA., Nov. 23—Calvin E. Woods, receiver for the Bethlehem Motors Corp., will apply to the United States district court at Philadelphia Nov. 28 for permission to sell the plant.

MEN OF THE INDUSTRY

Edward H. Fitch has been appointed manager and **J. H. Connors,** manager of mechanical sales of the Republic Rubber Corp. Fitch served as district manager of the Philadelphia division of the Diamond Rubber Co. for fourteen years and upon the consolidation of the Goodrich and Diamond divisions in that city was placed in charge. For the past three years he has been manager of sales to automobile manufacturers for the Diamond division with headquarters at Akron. In June, 1920, he was appointed director of sales of the Diamond company covering tires and mechanical goods. Connors had been in charge of the mechanical sales in the Boston district for the B. F. Goodrich Co. for fifteen years. Subsequently he became manager of mechanical sales in the Philadelphia district and manager of mechanical sales of the Diamond division of the Goodrich company for the central district.

W. B. Mowbray, assistant purchasing agent of the Amalgamated Sugar Co., has been appointed general manager of the Aero Cushion Tire Co. He succeeds general manager **W. E. Spencer** who is planning to take care of his Wyoming interests, but will remain at the factory for several weeks. **Major W. C. White** becomes salesmanager and will be closely associated with Mowbray in furthering the company's business. The new management is planning important changes which will include the opening of a number of branches in the intermountain West. Plans are under way for amending the articles of incorporation and re-financing the company.

William R. Petze has been appointed sales manager of the American Metal Parts Co. of Boston which manufactures piston rings. Petze has a record of 17 years in the automotive industry, the greater part of which has been spent with automotive and hardware jobbers in this country and in Canada. He is credited with having had much to do with working out the present jobber policy of distributing piston rings. Until recently he was sales manager for branches of the Splitdorf Electrical Co. of Newark.

J. H. Willson, former managing director of General Motors, Ltd., of London, England, has become president and general manager of the Maxwell-Chalmers Sales Co. of Chicago. Before going to London for General Motors he was manager of the New York, Brooklyn and Long Island territory for the Chevrolet Motor Co.

Arthur G. Hertzler, who has been sales manager of the Bearings Co. of America, Lancaster Pa., and connected with that firm in various capacities for eighteen years, has severed his connection with the company and will make his home in Salt Lake City. He has not announced his business plans for the future.

A. F. Pond, chief chemist for The Goodyear Tire & Rubber Co. of Canada, Ltd., has been transferred to Los Angeles to succeed **Burgess Darrow** in similar work at the Goodyear's coast plant. Darrow returns to Akron as development manager of the parent company.

Claude C. Ostrom, formerly purchasing agent of the Locomobile and later general manager of the Washington Steel & Ordinance Co., has become associated with the Pennsylvania Forge Co. as vice-president, and in charge of sales.

Verne G. Orr, secretary and general manager of the Waterloo-Overland Co. of Waterloo, Iowa, has been appointed manager of the Willys-Overland branch at Indianapolis. The territory under his control consists of Indiana, Kentucky and a part of Illinois.

D. J. Maloney, who for the past three years has been connected with the Carroll Engineering Co., as assistant general manager is now associated with the Columbia Engineering Co., Dayton, Ohio as president and general manager.

F. J. Jackson has been appointed manager of the Barley Motor Car Co.'s factory branch at San Francisco. **George Clark,** former manager, has been made sales manager of all territory west of Denver.

Rudolph Miller, who has been advertising manager of the National Motor Car & Vehicle Corp. of Indianapolis, has been made assistant sales manager.

W. A. Henderson, manager of the Dort Auto Body Works, Kalamazoo, since its purchase from the Lull Buggy Co., has resigned.

C. E. Sorenson and **C. Burbaker,** directors of the Ford Motor Co., are leaving for a tour of inspection of the Ford plants abroad.

Thomas Brooks, Inc., has been appointed Elgin distributor in Detroit and four surrounding counties.

FINANCIAL NOTES

Ajax Rubber Co., it is understood, is planning to fund that portion of its bank loans falling due next month, approximating $5,000,000, through the sale of notes or bonds. At present there is outstanding $10,000,000 of an authorized issue of $20,000,000 ($50) capital stock. The company has no funded debt. The new financing, Ajax interests say, is not a matter of necessity but through the belief that bank loans can be eliminated on a favorable basis.

Stoughton Wagon Co., Stoughton, Wis., is starting work on a new group of buildings for its motor truck division to replace those recently destroyed by fire. The company announces that all orders will be delivered according to schedule, having made arrangements to care for production and prompt shipments.

Franklin Automobile Co., during the first ten months of this year, shipped 3,256 sedans which represents an increase of 16 per cent over the same period last year.

Kelsey Wheel Co. has declared an initial dividend of $1.50 a share on the common stock, payable Jan. 2 to stockholders of record Dec. 20.

Chevrolet Opens New Plant in Indianapolis

INDIANAPOLIS, Nov. 23—Chevrolet Bros. Mfg. Co. of this city is now located in its new factory here. Arthur Chevrolet is president; Louis Chevrolet, treasurer, and Arthur H. Serr, sales manager. The chief product will be Frontenac cylinders for Fords. The company will also build the Fronty-Ford racing cars.

Louis Chevrolet, designer and builder of Frontenac racing cars, will also have factory space in the new building, as will Arthur Chevrolet, Inc., manufacturer of steel gear rings for stripped flywheels.

G. M. Contemplates No Radical Changes

Gradual Improvements Will Be Made in Lines for 1922 Selling Season

NEW YORK, Nov. 23—General Motors Corp. has in prospect no radical or sensational plans, notwithstanding sundry reports to the contrary. The corporation will move along in the next year much as it has in the past, making gradual improvements in its lines and fully prepared for the era of keen competition upon which the industry has entered.

It can be stated positively that none of the divisions of the corporation will be discontinued in 1922 with the exception of Scripps-Booth. Notice of the dissolution of this company has been filed at Albany but it is understood the factory will not be sold. Announcement as to the uses to which it will be put is expected within 30 days.

Era of Easy Sales Gone

The air-cooled development will be continued but showing or marketing at an early date is not to be expected as the work is still in the experimental stage and the General Motors Corp. policy is against production until exhaustive tests have been made and the corporation is assured that the product for which it must necessarily stand sponsor is everything that might be desired.

The General Motors Corp. realizes fully that the era of "easy sales" has gone, probably never to return. They are urging constantly the necessity of intensive and intelligent selling efforts. They insist that the salesman must go to the prospect and not wait for the potential purchaser to come to him.

Efficient Servicing Necessary

As a corollary of successful salesmanship, they contend there must be efficient servicing so that a motor car user who once buys a General Motors product never will stray from the field. Hooked up closely with sales and service is a determination to give full value for every dollar paid for any of the General Motors models. The prices of the corporation's lines have followed closely the downward trend of materials, taking into consideration also the lower cost and greater efficiency of labor.

Mooney Is Transferred from Remy to G. M. Export

NEW YORK, Nov. 23—Announcement was made to-day by President duPont of General Motors Corp. that J. D. Mooney, who is now general manager of the Remy Electric division at Anderson, Ind., will be transferred to the General Motors Export Co. as operating vice-president. I. J. Reuter, who is now general superintendent of the Remy Electric division will succeed Mooney as general manager.

Calendar

SHOWS

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

Jan. 28-Feb. 4—Chicago, Automobile Salon, Hotel Drake.

Jan. 7-13—New York, National Automobile Show, Madi- Automobile Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 28-Feb. 4 — Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

Feb. 6 to 11 — Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11 — Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

FOREIGN SHOWS

Nov. 12-27—Buenos Aires, Annual Motor Show, La Pabellon de las Sosas, Automovil Club Argentino.

Nov. 26 - Dec. 3 — Shanghai, China, Automobile Show.

Nov. 28-Dec. 3—London, Motorcycle Show.

Dec. 3-14—Brussels, Belgian International Automobile Show.

March, 1922 — Santiago, Chili, Annual Automobile Show.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Associcao Automobilista Brazileria.

CONVENTIONS

Dec. 6-8 — Chicago, Second Annual Meeting of American Petrolum Institute.

Dec. 10—New York, American Institute of Mining and Metallurgical Engineers.

Dec. 20—Philadelphia, American Society of Mechanical Engineers.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

Jan. 30-31—Chicago, Fifth Annual Convention, N. A. D. A., La Salle Hotel.

Jan. 30-Feb. 2—Boston, Sixth Annual Conference of the International Delivery Association, Copley Plaza Hotel.

June 11-15—Milwaukee, Annual International Convention of the Associated Advertising Clubs of the World.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

S. A. E. MEETINGS

Detroit, Dec. 23, Feb. 24. Mar 24, April 28, May 26.

New York, Jan. 11-14, 1922—Annual Meeting.

Chicago, Feb. 1

Minneapolis, Feb. 8—Tractor Meeting.

Harding Commended for Good Roads Aid

A. A. A. Resolution Praises President and Townsend—Insurance Discussed

DETROIT, Nov. 23—Resolutions commending President Harding and Senator Townsend for their activity in behalf of Federal road legislation, were adopted following a two-day conference of the Automobile Association of America executives at the Hotel Tuller this week. The resolutions will be forwarded to the executive committee of the association at Washington for immediate action and it is further urged that these Federal officers and others be asked to continue their efforts looking for further Federal cooperation.

Other resolutions important to the American motoring fraternity which were adopted at the convention epoused the financing of the association on the basis of 25 cents a member of each affiliated club; that the present road marking system be replaced by a comprehensive system installed in each state under the approval of the Federal government; that the present basis of motor vehicle taxation is unfair in some cases, and that an investigation be undertaken to bring about a more equitable adjustment.

The conference went on record through resolution as considering the matter of motor vehicle insurance a local rather than a national concern. It was recommended, however, that this subject be carefully investigated by national headquarters and all affiliated clubs of the association be advised as to the best methods employed by the most successful local clubs in the handling of insurance matters.

The insurance study was one of the red hot features of the convention and the possibility of the formation of a national insurance bureau under the auspices of the A. A. A. was frankly discussed. Opposition on the part of J. L. Haskin of the Omaha Automobile Club, who favored the local handling of the problem rather than through national action, decided the convention toward favoring the resolution finally adopted.

A study of standardized traffic regulations was also recommended by resolution to the executive committee and to make and carry out plans through its affiliated clubs and general membership calculated to secure the adoption of such regulations by states and cities.

Jobbers Buy Heavily at Chicago Meeting

CHICAGO, Nov. 19—The Automotive Equipment Association's business exhibit came to a close here today with strong evidences of an upturn in business, in contrast to the feeling the first day or two, when buying was light. By the middle of the week the jobbers had passed their buying record for the entire show a year ago and when the doors were closed it was generally agreed among manufacturers that business on the exhibit floor had been the best since the association started this feature of its activities three years ago.

Statements of jobbers from various sections of the United States and Canada indicated that tonnage turnover of the average jobber in 1921 would be about 85 per cent of last year and dollars and cents volume about 70 per cent, the difference being due to price reductions.

Jobbers have had heavier retail buying since October 1 than before then, which is just the opposite of the usual condition. Reequipment lines naturally have run heaviest, but sales of car accessories, shop equipment and tools have been fair during the past six weeks.

BRITISH PRICES TOO HIGH

LONDON, Nov. 14 (*By Mail*)—Sir Raymond Dennis, managing director of Dennis Bros., Inc., Guildford, back from a twenty months' world tour, says in effect that there is a call for British motor goods but that present prices are too high.

Trade in Britain Declines in October

Gross Decrease for Year Will Be Within 40 to 50 Per Cent of 1920

LONDON, Nov. 11 (*By Mail*) — Britain's imports of cars, trucks and chassis, tires, motorcycles, and parts of cars, trucks and motorcycles in October had a gross value of $4,035,425 (at par).

Numerically their values were: Cars 126 (2150), trucks 67 (450), chassis 344 (698), and motorcycles 39 (212). The value of the parts imported were: Vehicle, $1,327,760 ($3,796,380); motorcycle, $11,265 ($132,030); tires, $1,836,635 ($2,442,900). The figures in brackets are the corresponding returns for 1920.

The month's exports of British automobiles and parts had a gross value of $1,565,675 ($6,514,115), and of tires $857,380 ($2,520,265). The numerical values and the destinations were: Cars 128, of which 42 (233) went to British India, 14 (74) to New Zealand, and 72 (334) to countries not specified; trucks, 5 (25) to British India, New Zealand none (31), and 18 (74) to countries not specified, making a gross total of cars and trucks of 151 (771). Chassis exports were 55 (385) to countries not specified, whereas in October, 1920, there were 8 specially scheduled for British South Africa. The month's motorcycle exports were 430 (2333), destination not given.

There has been a marked decrease compared with October, 1920, and the ten months comparative figures go to show that the gross reduction will be within 40-50 per cent of the January-October period of 1920.

TOWER RECEIVER NAMED

GREENVILLE, MICH., Nov. 21—The Grand Rapids Trust Co. has been appointed receiver for the Tower Motor Truck Co.